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Part II

Environmental Protection Agency

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Certification and Test Procedures; Non-Methane Hydrocarbon Standards for Mobile Sources

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 86

[AMS–FRL 1952–4]

Control of Air Pollution From New Motor Vehicles and New Motor Vehicle Engines: Certification and Test Procedures; Non-Methane Hydrocarbon Standards for Mobile Sources

AGENCY: Environmental Protection Agency.

ACTION: Notice of proposed rulemaking.

SUMMARY: The proposed rule would establish non-methane hydrocarbon (NMHC) exhaust emission standards for light-duty vehicles, motorcycles, light-duty trucks and heavy-duty engines while also permitting vehicle manufacturers, at their choice, to continue to use total hydrocarbon (THC) exhaust emission standards. This proposed rule addresses one of the actions which the Environmental Protection Agency stated would be taken to reduce the regulatory burden on the motor vehicle industry (46 FR 21628, April 13, 1981). The purpose of the regulatory relief actions is the reduction of costs to manufacturers and consumers while incurring little or no air quality penalty.

Please note that EPA specifically requests comments on a number of items near the end of this preamble. EPA encourages all individuals and organizations which are interested in this rulemaking to participate in the public hearing and/or to submit their comments to the docket.

DATES: EPA will hold public hearings on this notice on January 22, 1982 beginning at 9:00 am. Pursuant to Section 307 of the Clean Air Act, the record of the public hearing will be kept open for 30 days following the close of the hearing, to provide an opportunity for submission of rebuttal and other information. Comments must be received, therefore, on or before February 22, 1982. The 1983 model year vehicles will be the first affected by the proposed action.

ADDRESSES: The public hearing will take place in the Conference Room at the EPA Motor Vehicle Emissions Laboratory, 2565 Plymouth Road, Ann Arbor, MI 48105. Interested persons may submit written comments on this rulemaking to the U.S. Environmental Protection Agency, Central Docket Section, (A–130), Attn: Docket No. A–81–24, 401 M Street SW, Washington, D.C. 20460. Two copies of comments are requested but not required.

Supporting material relevant to this proposal has been placed in the docket. Docket No. A–81–24 is open to the public and is located in the U.S. Environmental Protection Agency, Central Docket Section, West Tower Lobby, Gallery I, 401 M Street, SW, Washington, D.C. The docket may be inspected between 8 am and 4 pm on weekdays, and a reasonable fee may be charged for copying.

FOR FURTHER INFORMATION CONTACT: Mr. F. Peter Hutchins, U.S. Environmental Protection Agency, Emission Control Technology Division, 2565 Plymouth Road, Ann Arbor, MI. 48105, (313) 668–4340.

SUPPLEMENTARY INFORMATION:

Continuation of Summary

The proposed non-methane hydrocarbon standards represent the same percentage reduction in non-methane hydrocarbon emissions from base year vehicles as is required by the corresponding total hydrocarbon standards for total hydrocarbon emissions from base year vehicles. The proposed non-methane hydrocarbon standards and the corresponding total hydrocarbon standards are tabulated as follows:

CURRENT TOTAL HYDROCARBON AND PROPOSED NON-METHANE HYDROCARBON EXHAUST EMISSION STANDARDS

Vehicle class	1983 model year		1984 model year and later	
	THC	NMHC	THC	NMHC
Light-duty vehicles	0.41 g/mi	0.39 g/mi	0.41 g/mi	0.39 g/mi.
Light-duty trucks	1.7 g/mi	1.62 g/mi	0.80 g/mi	0.76 g/mi.
Motorcycles	5.0 g/km	4.75 g/km	5.0 g/km	4.75 g/km.
Heavy-duty engines	(a) 1.5 g/BHP-hr and THC+NOx=10 g/BHP-hr or. (b) THC+NOx=5 g/BHP-hr.		1.30 g/BHP-hr	1.24 g/BHP-hr.

A non-methane hydrocarbon standard is not proposed for 1983 MY heavy-duty engines because of the incompatibility between sampling procedures applicable to that model year and analytical procedures used for determining the methane content.

If these regulations are promulgated as a final rule, EPA anticipates that there will be no significant difference in the ambient ozone level improvements achieved within the next ten years. By the year 2000, it is projected that the improvement in ambient ozone levels, relative to the levels which prevailed in 1979, will be approximately 1 percent less with non-methane hydrocarbon standards than with total hydrocarbon standards; i.e., a 17 percent reduction in ambient ozone levels rather than an 18 percent reduction at low altitude and a 20 percent reduction rather than a 22 percent reduction at high altitude.

I. Background

Background materials pertinent to this action are divided into three general areas. These areas cover: A. Factors leading to the existing total hydrocarbon standards; B. Procedures applicable to air quality impact determination and; C. Waiver of Federal Preemption for the State of California.

A. The material referred to as exhaust hydrocarbon emissions, while measured and reported as a single entity, is composed of dozens of separate and distinct hydrocarbon compounds or species. Each species, within the total, exhibits a different level of reactivity in the ozone (photochemical smog) formation process. The need to control hydrocarbon emissions from mobile sources was and is, therefore, based on the part played by each species in the formation of photochemical smog. Methane was recognized as being nonreactive in this process and was excluded, therefore, in the rollback model developed prior to 1970 by the National Air Pollution Control Administration for projecting future motor vehicle emission control requirements. These projections formed the basis for the 1970 Clean Air Act Amendments applicable to motor vehicles. The degree of hydrocarbon exhaust emission control required by the Clean Air Act Amendments of 1970 was expressed as a 90 percent reduction from the levels allowable for the 1970 model year.

The definition of hydrocarbon exhaust emission and, therefore, the standard applicable to any model year vehicle has historically been based upon the test procedure and the type of instrument used in routine analyses of vehicle exhaust hydrocarbon samples. In 1970, when the Clean Air Act was amended, and future control requirements specified, the type of analytical instrument used for measuring exhaust hydrocarbons was the non-dispersive infrared (NDIR) type. This type of instrument (NDIR) did not provide a uniform response (reported as carbon) to each species in the exhaust sample. The effects of this characteristic of the instrumentation were that hydrocarbon exhaust emissions allowable from 1970 model year light-duty vehicles were expressed neither as total hydrocarbons, non-methane hydrocarbons nor as reactive hydrocarbons and that the total amount of hydrocarbon in the exhaust gases was under-reported. Examples of hydrocarbons for which the NDIR gave low response were: methane, ethylene, propylene, acetylene, benzene, etc. Beginning with the 1972 model year, EPA required a change in the type of instrumentation used in the determination of vehicle exhaust hydrocarbon emissions. The type of instrument specified was the flame ionization detector (FID). This type of instrument (FID) provided an almost uniform response to each hydrocarbon species. As a result of this change in instrumentation, all hydrocarbons in the exhaust gases were and are fully reported (total hydrocarbon), both the nonreactive and the reactive species. EPA did not exclude the methane fraction at that time despite the change in instrumentation because: (1) The methane fraction of the baseline year exhaust hydrocarbons was taken to be inconsequentially low, and (2) emission control systems were expected to reduce all hydrocarbons equally. Additionally, techniques for the routine measurement of methane were not considered to be available when the change in instrumentation was required.

Introduction of catalyst technology to control vehicle exhaust emissions altered the composition of the exhaust hydrocarbons emitted into the atmosphere. This change in composition resulted from preferential oxidation of heavier species in the catalytic converter. Because methane is not readily oxidized in the catalytic converter, the methane fraction in the exhaust gases increases relative to the total hydrocarbon emissions.

In 1973, the Ford Motor Company petitioned EPA to exclude methane from the exhaust hydrocarbon standards for 1975 model year vehicles because of the anticipated use of catalysts to control emissions and because of the nonreactivity of methane. On May 10, 1974, EPA published an ANPRM pertaining to the exclusion of methane from the exhaust emission standards. On February 10, 1976, EPA distributed the summary and analysis of the comments to the ANPRM. EPA concluded that substantiation had not been provided for the benefits claimed by vehicle manufacturers for non-methane hydrocarbon standards. EPA could not justify, therefore, the allocation of Agency resources necessary for conversion to non-methane standards.

On October 20, 1978, the Ford Motor Company again petitioned EPA for exclusion of methane in hydrocarbon exhaust emission standards. This petition was directed to 1980 and 1981 model year vehicles. On February 16, 1979, EPA responded to this petition and elected to continue to include methane in the hydrocarbon standards. As a result of EPA's denial of its petition, Ford sought court review of the hydrocarbon exhaust emission regulations on the grounds that EPA had exceeded its authority by including methane in the regulations.

On July 3, 1979, the U.S. Court of Appeals for the District of Columbia Circuit found that the regulations, which included methane as a measured hydrocarbon, were within the scope of EPA's authority. *Ford Motor Company* v. *EPA*, 604 F. 2d 685 (D.C. Cir., 1979).

B. On July 8, 1977, EPA published a "Recommended Policy on Control of Volatile Organic Compounds" (42 FR 35314) which classified two hydrocarbons as having negligible photochemical reactivity. The hydrocarbons were methane and ethane. Because of their negligible reactivity, EPA concluded that these hydrocarbons should be exempt from regulations under State Implementation Plans. The effect of this recommended policy is that ambient concentrations of methane and ethane, irrespective of the source, are not included in determinations of compliance with National Ambient Air Quality Standards.

EPA policy on vehicle exhaust hydrocarbon emissions has been to obtain the maximum reduction in reactive species through the application of total hydrocarbon emission standards while using only the reactive hydrocarbon fraction in air quality impact calculations. Consistent with this policy, EPA computations of air quality benefits attributable to vehicle exhaust emission standards exclude the methane fraction of exhaust emissions.

C. Section 209(b) of the Clean Air Act requires EPA to waive Federal preemption of state emission standards for a state which had promulgated standards before March 30, 1966 unless the Administrator finds that the state's determination that its standards, in the aggregate, are at least as protective of public health and welfare as applicable Federal standards is arbitrary and capricious. EPA waived Federal preemption with respect to hydrocarbon exhaust emission standards for the State of California and permitted the adoption of California optional non-methane hydrocarbon standards for light-duty vehicles. Adoption of the optional standards became effective with the 1980 model year in California. The standards which California adopted for light-duty vehicles were 0.41 g/mile total hydrocarbons or 0.39 g/mile non-methane hydrocarbons. One result of the waiver of Federal preemption was the purchase of appropriate analytical equipment by vehicle manufacturers for measuring non-methane hydrocarbon emissions. Procurement leadtimes and cost of analytical equipment are, therefore, not significant factors in this action.

II. Option Selection

Selection of either the NMHC standard or the THC standard will be at the discretion of the vehicle manufacturer and will be made for each engine family. Option selection on the basis of engine families will maximize the flexibility provided by this action; i.e., manufacturers will not be required to select the same option for all of their products. The option selected will be applicable for all testing (Certification, Selective Enforcement Audit, Recall, etc.) performed in the determination of compliance with the emissions standards.

EPA does not anticipate any impact on state inspections (short tests) as a result of this action. The reasons for this conclusion are that: (1) Equipment employed in inspection stations usually utilizes NDIR analyzers with the associated low methane response, and (2) short test cut points are designed to identify those vehicles with very high emission levels and will, therefore, not be impacted by the small differences which may exist between the two options.

III. Alternatives Considered

The four alternatives to the existing standards which were considered were: (1) Non-methane hydrocarbon standards with optional total hydrocarbon standards, (2) hydrocarbon reactivity standards with optional total hydrocarbon standards, (3) adoption of non-methane hydrocarbon standards only and (4) adoption of hydrocarbon reactivity standards only. The factors considerd in comparing the alternatives were: (a) the effect on air quality, (b) availability, purchase costs and operational costs of instruments for rapid, routine analyses, (c) the data base for individual hydrocarbon species of base year vehicles, (d) reactivity scale for the hydrocarbon species, (e) development of reactivity indices where these did not exist, and (f) methodology for determining a composite reactivity index of base year vehicles.

Implementation of either the non-methane alternative or non-methane standards only would require a relatively simple and low cost instrument for measuring methane as an addition to existing equipment. These instruments are being marketed and most laboratories are using them. A usable methane fraction data base exists for most vehicles which will be affected (light-duty vehicles). Extrapolation of the mass fraction of one hydrocarbon species (non-reactive methane) from the light-duty vehicle data base to light-duty trucks and motorcycles involves only that component which is non-reactive. Any resulting error, if there is one, will tend to be small.

In the case of the hydrocarbon reactivity standard alternative, instrumentation for *low cost, rapid, routine* analysis of exhaust gases is not available (gas chromatographic analyzers are costly and the analyses are time consuming and, therefore, also costly). Even if appropriate instrumentation were available, there is no single, agreed-upon scale of reactivity for all of the species present in the exhaust gases. Additionally, the data base for light-duty vehicles is inadequate for establishing a reactivity index based on the reactivity of individual species for base year vehicles; i.e., a relatively small error in the assigned fraction of a highly reactive hydrocarbon will result in a relatively large change in the computed composite reactivity index.

Alternative 1, the non-methane hydrocarbon mass standards with optional total hydrocarbon mass standards, was selected because: (1) Essentially equal effects on air quality can be expected for each of the alternatives, (2) it offers essentially the same benefits to vehicle manufacturers as the other alternatives, (3) it allows each manufacturer to select the most cost-effective option for its individual situation, and (4) it can be rapidly implemented at low cost. It is anticipated that motorcycle and heavy-duty engine manufacturers will not choose the non-methane option and are, therefore, not expected to be affected by this action.

IV. Discussion of Issues

A. Interpretation of the Statute With Respect to the Inclusion/Exclusion of Methane as a Regulated Exhaust Hydrocarbon

As explained in Section I, Congress established the statutory standard for hydrocarbon exhaust emissions in 1970 for light-duty vehicles, requiring manufacturers to reduce those emissions by 90 percent from the level allowable for the 1970 model year. In 1977, Congress extended this standard to cover heavy-duty vehicles and motorcycles.

The legislative history of this provision shows that the need for controlling hydrocarbon exhaust emissions from vehicles was based upon the formation of photochemical smog (ozone) from oxides of nitrogen and hydrocarbons under the influence of sunlight.[1] It was recognized even in 1970 that methane did not react this way and was not a factor in the formation of smog: the rollback model used to project the required level of control for motor vehicles excluded methane, and methane was not treated as a controlled hydrocarbon in the preparation of air quality criteria documents for hydrocarbons. However, as explained in Section I, the instrument used in 1970 to measure vehicle exhaust hydrocarbon emissions did not uniformly measure each species present, both reactive and non-reactive species, and undercounted the total.

To provide more accurate measurements, in 1972 EPA required a change in the instrumentation used to determine vehicle exhuast hydrocarbon emissions. The new instrument fully and uniformly measures each species present in the exhaust gases (including methane). Nevertheless, there is no indication that Congress considered the implications of this new instrumentation. While Congress did subsequently alter the statutory deadlines for compliance with hydrocarbon emissions limitations, it did not change the standards themselves from the numbers originally promulgated in 1970.

In the case of *Ford Motor Company* v. *EPA supra*, the Court of Appeals found that the Clean Air Act permits EPA to regulate vehicle exhaust hydrocarbon emissions on the basis of total hydrocarbons, i.e., including methane. The court did not decide, however, whether EPA was *required* to regulate hydrocarbons in this way.

Certainly there is nothing in the legislative history of the 1970 statute or later amendments to suggest that Congress wished to limit EPA's flexibility to refine emission standards and make them more precise, as technical capabilities in this field improved. Hence, EPA has indicated in the past that it believes the Act gives it discretion to promulgate an alternative non-methane standard, 44 FR 20048 (April 4, 1979). The Agency believes that present circumstances make it proper to exercise this discretion.

Recognition by EPA of the need to control the cost of regulations has lead to the reevaluation of existing regulations. As a result of the reevaluation, EPA has concluded that provision of optional standards to permit exclusion of methane as a measured exhaust hydrocarbon: (1) Conforms with the need for control of reactive exhaust hydrocarbons, (2) is within the authority of the Agency, (3) provides the opportunity for a degree of cost reduction and (4) will have little or no significant impact on air quality.

B. Optional Non-Methane Hydrocarbon Standards vs. Either Optional Reactive Hydrocarbon Standards or Optional-Non Methane/Ethane Hydrocarbon Standards

As part of the reevaluation of the existing standards, EPA considered ethane for exclusion along with methane as well as the potential for adoption of reactive hydrocarbons standards.

The ethane content of exhaust gases from 1970 model year vehicles was on the order of ½ percent. With catalyst vehicles, the ethane content is on the order of 1 to 1½ percent. Because of these very low concentrations of ethane, it appears unlikely that there will be any benefits attainable through the exclusion of ethane which are not achieved by the exclusion of methane. Determination of the ethane content in vehicle exhaust gases would necessitate the introduction of gas chromatographic equipment capable of measuring each of the hydrocarbon species. This type of equipment is costly and sample analysis

[1] *A Legislative History of the Clean Air Act Amendments of 1970*, Volume 1, p. 425–28 and 761–772.

time is measured in hours rather than minutes. The implementation costs of non-methane/ethane hydrocarbon standards for analytical equipment, performance of analyses, equipment maintenance, etc., would be expected to be 5 to 10 times higher than the costs of non-methane standards. Additionally, the leadtime necessary for implementation would change from almost zero (analytical equipment for non-methane standards can be considered to be in place) to a few years. EPA has concluded, therefore, that the costs of non-methane/ethane standards exceed any possible benefits to vehicle manufacturers, but would welcome comments on this issue.

Because of the differences in the reactivities of the hydrocarbon compounds which collectively constitute hydrocarbon exhaust emissions, an exhaust hydrocarbon reactivity standard would be the ideal method for the control of these materials. Major problems associated with this approach to the control of hydrocarbon exhaust emissions are: (1) The lack of an adequate data base upon which to establish the composition of base year hydrocarbon exhaust emissions, (2) the lack of a universally accepted and proven reactivity scale for hydrocarbon compounds, and (3) the costs of the analytical equipment for determining the composition of each exhaust sample coupled with the time and, therefore costs of each analysis. For these reasons, EPA does not view an exhaust reactivity standard as being practical at this time.

It is the conclusion of EPA that the non-methane hydrocarbon standards option is the most cost-effective approach. Again comments are welcome on this point.

C. Determination of the Optional Non-Methane Standards

The procedure used in establishing the non-methane hydrocarbon standards is the same as that which was used for establishing the existing total hydrocarbon standards; i.e., the optional non-methane hydrocarbon standards represent the same percentage reduction in non-methane hydrocarbons from base year vehicles as are required by the total hydrocarbon standards for total hydrocarbons.

The data base for determining the methane content of base year, light-duty vehicles is not large. It consists of data compiled pursuant to the 1974 ANPRM [2], testing of two non-catalyst vehicles by Gulf Research and Development as part of a contract with EPA [3], and data collected by EPA contractors in tests of in-use vehicles [4]. The data base is adequate, however, for making the determination of the methane content in exhaust gases of base year light-duty vehicles. The average methane content was five percent.

While the emission standards for heavy-duty diesel engines are determined on the basis of emissions from base year gasoline engines, the data base for diesel engines was surveyed to identify any potential problems. In the case of heavy-duty diesel engines, the data base on methane is very small. Two sources are available. Reference [5] indicates that the average methane fraction in the exhaust of four heavy-duty diesel engines tested was approximately ⅓ that of the methane content of one industrial gasoline engine tested, on the test procedure used. The methane fraction reported for the industrial gasoline engine was, however, five to six times higher than the methane fraction determined for light-duty vehicles on the Federal Test Procedure. The second source [6], in-house testing of diesel engines, indicates methane contents approaching four to five percent.

EPA testing of heavy-duty gasoline engines [7], shows an average methane content in the exhaust gases of approximately seven percent.

Five percent was chosen as being representative of the methane fraction in the exhaust gases of heavy-duty engines (diesel and gasoline).

A data base does not exist for determining the base year methane fraction of hydrocarbons in the exhaust of light-duty trucks and motorcycles. The methane fraction was selected as five percent because of the similarities in: (1) Engine technologies between base year light-duty vehicles, light-duty trucks and motorcycles, (2) test cycles, and (3) because the same fuel (gasoline) is used in nearly all of these base year vehicles. It is recognized that, relative to light-duty vehicles and light-duty trucks, the higher average rotational speed of motorcycle engines may have some small effect on the size of the methane fraction.

D. Analytical Equipment for Routine Testing and Lead-time for Implementation

The adoption by the State of California of a non-methane hydrocarbon standard for light-duty vehicles has resulted in either the purchase and installation of appropriate test equipment or the securing of access to the use of the equipment by these vehicle manufacturers. Because light-duty vehicle manufacturers are often also manufacturers of light-duty trucks (e.g., General Motors, Ford, Chrysler, American Motors, VW, Nissan, Toyota) most, if not all, manufacturers of light-duty trucks have the required equipment in-use.

On the basis of the responses to the ANPRM (1974), it appears that most heavy-duty engine manufacturers would have chosen to use the total hydrocarbon option, thus removing the need to purchase the equipment necessary for determining methane. EPA is presently modifying the 1984 heavy-duty engine standard to levels not expected to require the use of catalysts. It is expected, therefore, that heavy-duty engine manufacturers will choose not to use the non-methane option. If a heavy-duty engine manufacturer wishes to use the non-methane option, equipment modifications will be similar to that made for light-duty vehicles and light-duty trucks; i.e., the addition of the methane analyzer. The samples would then be analyzed for total hydrocarbons and for methane.

In the case of motorcycles, it is anticipated that very few manufacturers would have the necessary analytical equipment on hand for determining methane. Honda and BMW would be expected to have the appropriate equipment because both companies also produce light-duty vehicles. However, when catalyst technology is not used in achieving the required emission levels (catalysts are not used on motorcycles), the methane fraction of exhaust gases from new vehicles is expected to be essentially the same as the methane fraction in base year vehicles. Using the existing total hydrocarbon standards would, therefore, permit these manufacturers to forego the purchase of equipment for determining methane.

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[2] "Discussion of Major Comments on Individual Issues in Response to the Advanced Notice of Proposed Rulemaking of May 10, 1974 on Hydrocarbon Exhaust Emission Standards and Test Procedures to Prevent Exclusion of Methane," Office of Mobile Source Air Pollution Control; U.S. EPA, 1976.

[3] "Effect of Ambient Temperature on Vehicle Emissions and Performance Factors," Gulf Research and Development Co., 1979, EPA Contract No. EPA 68-03-2530; National Technical Information Service Nos. PB80-162-753, PB80-173-776, PB80-173-784.

[4] Computer printout of EPA data base compiled from tests on in-use vehicles.

[5] "Some Diesel Exhaust Reactivity Information Derived by Gas Chromatography," Lauden, E. W. and Perey, J. M., Caterpillar Tractor Co., SAE Paper No. 740530.

[6] Computer printout of EPA data base compiled from tests on base year heavy-duty diesel engines and 1972 MY heavy-duty gasoline engines.

[7] Computer printout of EPA data base compiled from tests on base year heavy-duty diesel engines and 1972 MY heavy-duty gasoline engines.

If motorcycle manufacturers were to choose the non-methane option, leadtime for purchasing and installing the necessary test equipment could become a factor. Instrument manufacturers are, however, producing the necessary equipment. Representative delivery times are two to four months for analytical equipment used in exhaust gas measurements.

In total, leadtime is not anticipated to be a problem for those manufacturers which might choose the non-methane option.

V. Environmental Impact

Under either the total hydrocarbon standards or the optional non-methane hydrocarbon standards the emission rates of reactive hydrocarbons from mobile sources are very low. In the case of light-duty vehicles, the emission rates of reactive hydrocarbons would be between 0.35 gm/mile and 0.29 gm/mile for a total hydrocarbon standard of 0.41 gm/mile vs. a rate of 0.39 gm/mile for the non-methane standard.

In 1982, mobile sources will contribute just over ⅓ of the total anthropogenic emissions of reactive hydrocarbons at low altitudes. At high altitudes, mobile source contributions will be just over one-half. The projections for mobile source contribution to the total reactive hydrocarbon emissions inventory in 1990 are for just under ⅛ at low altitude and just under ⅓ at high altitude. In the year 2000, the relative contributions from mobile sources are projected to be slightly lower than in 1990. For the U.S., the total anthropogenic and the mobile source contributions for the years 1982, 1990 and 2000, together with mobile source contributions expressed as a percentage of the total, are presented in tabular form below.

TOTAL NON-METHANE HYDROCARBONS EMISSIONS

[1000 tons/year]

	1982			1900			2000		
	Total	Mobile sources	Percent of total	Total	Mobile sources	Percent of total	Total	Mobile sources	Percent of total
Low Altitude									
THC Stds	4,119	1,400	34	3,514	516	15	3,935	524	13
NMHC Stds	4,119	1,400	34	3,586	588	16	4,040	629	16
High Altitude									
THC Stds	155	83	54	111	33	30	120	32	27
NMHC Stds	155	83	54	113	35	31	126	38	30

Comparison of the predicted effects on ambient ozone concentrations of total hydrocarbon and non-methane hydrocarbon standards (assuming 30 percent methane in the exhaust and Inspection and Maintenance) shows that there is negligible, if any, effect through the 1988 to 1990 timeframe. In the year 2000, the predicted effect is for a reduction (improvement) in ambient ozone concentrations relative to 1979 levels of 18 percent with total hydrocarbon standards and of 17 percent with non-methane hydrocarbon standards at low altitude. Comparable figures for high altitudes are 22 percent and 20 percent, respectively.

The projected effect of this proposed action on the ambient air, expressed in terms of air quality regions above standards and exceedances are as follows. In 1982 it is projected that there will be 17 low-altitude regions and two high-altitude regions which exceed standards. The projections for the year 2000 are for 15 low-altitude regions to exceed standards if the total hydrocarbon standards were maintained for mobile sources and the 16 low-altitude regions to exceed standards with non-methane hydrocarbon standards for mobile sources. With either the total hydrocarbon standards or the non-methane hydrocarbon standards, one high-altitude region is projected to exceed standards in the year 2000. The projected number of exceedances in 1982 are 95 at low altitude and eight at high altitude. The projections for the year 2000 are for four exceedances at high altitude with either the total hydrocarbon or the non-methane hydrocarbon standards for mobile sources. At low altitudes, the projections are for 85 exceedances with the total hydrocarbon standards and 90 exceedances with the non-methane hydrocarbon standards for the year 2000.

In the aggregate, reactive hydrocarbon emissions from mobile sources are projected to be a small fraction of the total and differences between THC standards or NMHC standards are not considered to be substantial.

VI. Economic Impact

This proposed rule will affect costs only for those manufacturers which choose the non-methane hydrocarbon option. Because the non-methane hydrocarbon standard is optional, only those manufacturers who can realize either a total savings from vehicle modifications or anticipate a marketing advantage, e.g., improved fuel economy or driveability, would be expected to adopt the option. It is anticipated that light-duty vehicle and light-duty truck manufacturers will choose the non-methane option because their products incorporate catalysts (gasoline-fueled vehicles) and that motorcycle and heavy-duty engine manufacturers will choose the existing total hydrocarbon standards. Light-duty vehicle and light-duty truck manufacturers are either already using methane analyzers or have access to that equipment because of the non-methane option adopted by California. Anticipated costs in this area are, therefore, judged to be negligible.

Some costs are expected for recalibration of the catalyst and other engine/emissions control components in the first model year following introduction of the optional NMHC standards. In subsequent years, these costs will not occur. It is expected, however, that these first year costs will be counterbalanced by savings attributable to the reduced use of catalytic materials or the substitution of lower cost components; e.g., use of a reed valve aspirator in place of an air pump. The cost of recalibrations and savings from reduced catalyst loading, etc., are expected to vary by engine family. EPA has not, therefore, attempted to quantify these values.

Vehicle manufacturers have indicated that some small improvements in vehicle driveability and fuel economy may result, for some vehicle specifications, from the adoption of a non-methane hydrocarbon option.

In the aggregate, it is expected that there will be no cost burden to the vehicle manufacturers who choose the option and that a small fuel savings

could result from the adoption of the non-methane hydrocarbon option.

Public Participation and Request for Comments

Interested persons may participate in this rulemaking by submitting written comments to the Administrator, by attending the public hearing, or both. To the extent possible the Agency requests that written comments be submitted prior to the public hearing. It is EPA's intention to assure all interested parties an opportunity to study all informtion which may become the basis for EPA's final action in this proceeding. Accordingly, the Agency will not consider in this rulemaking any material which cannot be made available to the public. Parties who wish to submit information in response to this Notice of Proposal Rulemaking are cautioned that EPA will not consider, but will return to the commenter, any comments which are claimed, in whole or in part, to be confidential.

All interested parties are encouraged to comment on this action. Comments are specifically requested on the subjects listed below. Identification of these specific subjects does not preclude the presentation of comments on other relevant subjects.

Please comments on or provide answers to each of the following:

1. Comment on the concept of optional non-methane and total hydrocarbon standards.

2. Comment on the relative benefits and costs associated with non-methane standards, non-methane/ethane standards and hydrocarbon reactivity standards. Please quantify either benefits or costs where possible.

3. Comment on the numerical values of the non-methane standards proposed.

4. Will there be a reduction in catalyst loading and by what amount as a result of choosing the non-methane option?

5. What are the projected cost savings to the manufacturer and to the consumer?

6. Will the benefits in fuel economy and driveability, previously indicated as potential benefits by manufacturers, be realized?

7. Will these benefits be realized with all vehicles or with only some of the vehicles meeting the non-methane option? What is the anticipated magnitude of the fuel economy benefit?

8. Will there be other benefits to the vehicle manufacturer or to the consumer?

9. Are there additional data which support/refute the methane fraction in base year vehicle exhaust gases for the four classes of vehicles?

10. Is the extrapolation from light-duty vehicle baseline data to light-duty trucks and motorcycles reasonable?

11. Do any manufacturers, other than light-duty vehicle and light-duty truck manufacturers, expect to use the non-methane option?

12. If there are others, will leadtime for instrumentation pose any significant problems?

13. Please comment on the legal authority to permit optional standards.

Administrative Designation

Under Executive Order 12291, EPA must judge whether a regulation is "major" and therefore subject to the requirement of a "Regulatory Impact Analysis." This regulation is not major because it invovles no negative cost impacts and has not significant effect on competition, productivity, investment, employment or innovation.

This regulation was submitted to the Office of Management and Budget for review as required by Executive Order 12291.

Impact on Small Entities

Section 605 of the Regulatory Flexibility Act requires that the Administrator certify regulations that do not have a significant impact on a substantial number of small entities. I certify that this regulation does not have such an effect because it affects motor vehicle and engine manufacturers, and among this group there are not a substantial number of small entities. Also, the primary effect of this regulation is the potential for a positive economic benefit to the industry, so no private parties should see any substantial adverse impact.

Impact of Recording Requirements

The information collection requirements in this proposed rule will be submitted to the Office of Management and Budget (OMB) for clearance under the Paperwork Reduction Act of 1980 (Pub. L. 95-511). The information requirements or recordkeeping in this proposed rule will not take place until it has been cleared by OMB. If OMB approves, the information collection requirements will take effect as set forth in this proposed rule. If not, EPA will revise the information requirements (and this rule, if appropriate) to comply with OMB's determination.

Authority

The statutory authority under which these actions are proposed are sections 202, 206, and 301 of the Clean Air Act.

Dated: December 11, 1981.

Anne M. Gorsuch,

Administrator.

PART 86—CONTROL OF AIR POLLUTION FROM NEW MOTOR VEHICLES AND NEW MOTOR VEHICLE ENGINES: CERTIFICATION AND TEST PROCEDURES

Part 86 of Chapter I, Title 40 of the Code of Federal Regulations is proposed to be amended as follows:

1. A new § 86.083-2 is proposed to read as follows:

§ 86.083-2 Definitions.

The following definitions apply beginning with the 1983 model year. Section 86.082-2 remains effective.

"Hydrocarbon(s)" (HC) and "total hydrocarbon(s)" (THC) means those substances as determined by a flame ionization detector (FID) as specified in: (1) Section 86.111-82 for Light-Duty Vehicles and Light-Duty Trucks; (2) § 86.1309-84, § 86.1310-84, § 86.1311-84 for Heavy-Duty Engines and (3) § 86.511-78 for Motorcycles.

"Non-methane hydrocarbon(s)" (NMHC) means those substances defined as hydrocarbon(s) or total hydrocarbon(s) less that part which is methane.

2. Section 86.084-2 is proposed to be amended by revising the introductory text to read as follows:

§ 86.084-2 Definitions.

The following definitions apply beginning with the 1984 model year. Sections 86.080-2 and 86.083-2 remain effective except those definitions which are hereby superseded.

* * * * *

3. A new § 86.083-3 is proposed to read as follows:

§ 86.083-3 Abbreviations.

The following abbreviations apply beginning with the 1983 model year. Section 86.078-3 remains effective.

THC—Total Hydrocarbon(s)
NMHC—Non-Methane Hydrocarbon(s)
CH_4—Methane
GC—Gas Chromatograph

4. A new § 86.084-3 is proposed to read as follows:

§ 86.084-3 Abbreviations.

(a) The abbreviations in this section are compiled from §§ 86.073-3 and 86.083-3 and apply to this subpart and also to Subparts B, D, H, I, J, N, O, and P of this part and have the following meanings:

accel.—acceleration.
AECD—auxiliary emission control device.
API—American Petroleum Institute.

ASTM—American Society for Testing and Materials.
BHP—brake horsepower.
BSCO—brake specific carbon monoxide.
BSHC—brake specific hydrocarbons.
BSNOx—brake specific oxides of nitrogen.
C—Celsius.
cfh—cubic feet per hour.
CFV—critical flow venturi.
CFV-CVS—critical flow venturi-constant volume sampler.
CH_4—methane.
CL—chemiluminescene.
CO_2—carbon dioxide.
CO—carbon monoxide.
conc.—concentration.
cfm—cubic feet per minute.
CT—closed throttle.
cu. in.—cubic inch(es).
CVS—constant volume sampler.
decel.—deceleration.
EP—end point.
evap.—evaporative.
F—Fahrenheit.
FID—flame ionization detector.
FL—full load.
ft.—feet.
g—gram(s).
gal.—U.S. gallon(s).
GC—gas chromatograph.
GVW—gross vehicle weight.
GVWR—gross vehicle weight rating.
h—hour(s).
H_2O—water.
HFID—heated flame ionization detector.
Hg—mercury.
hi—high.
hp—horsepower.
IBP—initial boiling point.
ID—internal diameter.
in.—inch(es).
K—kelvin.
kg—kilograms.
km—kilometer(s).
kPa—kilopascal(s).
lb.—pound(s).
lb.-ft.—pound-feet.
m—meter(s).
max.—maximum.
mg—milligram(s).
mi.—mile(s).
min.—minute(s).
ml—milliliter(s).
mm—millimeter(s).
mph—miles per hour.
mv—millivolt(s).
N_2—nitrogen.
NMHC—non-methane hydrocarbon(s).
NDIR—nondispersive infrared.
NO—nitric oxide.
NO_2—nityrogen dioxide.
NOx—oxides of nitrogen.
No.—number.
O_2—oxygen.
Pb—lead.
pct.—percent.
PDP-CVS—positive displacement pump-constant volume sampler.
ppm—parts per million by volume.
ppmC—part per million, carbon.
psi—pounds per square inch.
psig—pounds per square inch gauge.
PTA—part throttle deceleration.
R—rankin.
rpm—revolutions per minute.
RVP—Reid vapor pressure.
s—second(s).
SAE—Society of Automotive Engineers.
SI—International system of units.
sp.—speed.
TEL—tetraethyl lead.
THC—total hydrocarbon(s).
TML—tetramethyl lead.
UDDS—urban dynamometer driving schedule.
V—volt(s).
vs—versus.
W—watt(s).
WF—weighting factor.
WOT—wide open throttle.
wt.—weight.

5. A new § 86.083–8 is proposed to read as follows:

§ 86.083–8 Emission standards for 1983 and later light-duty vehicles.

(a)(1) Manufacturers may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. The standards set forth in paragraphs (a) through (c) of this section shall apply for vehicles sold for principal use at other than designated high-altitude locations. Exhaust emissions from 1983 and later model year light-duty vehicles shall not exceed:

(i) *Total hydrocarbons.* 0.41 grams per vehicle mile (0.255 grams per vehicle kilometer). *Non-Methane hydrocarbons.* 0.39 grams per vehicle mile (0.243 grams per vehicle kilometer).

(ii) *Carbon monoxide.* 3.4 grams per vehicle mile (2.11 grams per vehicle kilometer).

(iii) *Oxides of nitrogen.* 1.0 gram per vehicle mile (0.62 gram per vehicle kilometer).

(iv) *Particulate emissions (diesels only).* 0.60 gram per vehicle mile (0.373 gram per vehicle kilometer).

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calcaluated in accordance with those procedures.

(b)(1) Fuel evaporative emissions from 1983 and later model year gasoline-fueled light-duty vehicles shall not exceed:

(i) *Hydrocarbons.* 2.0 grams per test.

(2) The standards set forth in paragraph (b)(1) of this section refer to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part measured in accordance with those procedures.

(c) No crankcase emissions shall be discharged into the ambient atmosphere from any 1983 and later model year gasoline-fueled light-duty vehicle.

(d)(1) Model year 1983 and later light-duty vehicles sold for principal use at a designated high-altitude location shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions.

(i) *Total hydrocarbons.* 0.57 grams per vehicle mile (0.35 grams per vehicle kilometer). *Non-methane hydrocarbons.* 0.54 grams per vehicle mile (0.34 grams per vehicle kilometer).

(ii) *Carbon monoxide.* 7.8 grams per vehicle mile (4.8 grams per vehicle kilometer).

(iii) *Oxides of nitrogen.* The allowable levels of oxides of nitrogen from light-duty vehicles which are sold for principal use at designated high-altitude locations are the same as set forth in paragraph (a)(1)(iii) of this section.

(2) The standards set forth in paragraph (d)(1) of this section refer to the exhaust emitted over a driving schedule as set forth in Subpart B of this part and measured and calculated in accordance with those procedures.

(e)(1) Fuel evaporative emissions from 1983 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations shall not exceed 2.6 grams per test when tested under high-altitude conditions.

(2) The standard set forth in paragraph (e)(1) of this section refers to a composite sample of the fuel evaporative emissions collected under the conditions set forth in Subpart B of this part and measured in accordance with those procedures.

(f) No crankcase emissions shall be discharged into the ambient atmosphere from any 1983 and later model year gasoline-fueled light-duty vehicles sold for principal use at designated high-altitude locations.

(g)(1) All light-duty vehicles shall be capable (by initial design, adjustment, or modification) of meeting the applicable emission standards set forth in this section for any altitude of operation. Such adjustments and modifications shall:

(i) Be capable of being effectively performed by commercial repair facilities.

(ii) All adjustments and modifications recommended by the manufacturer to be performed on vehicles to satisfy this requirement must be included in the manufacturer's application for certification, and be approved in advance by EPA in accordance with § 86.079–22.

(2) Exemptions for vehicles from the high-altitude emissions standards as set forth in paragraph (d) of this section may be granted by the Administrator for vehicles that are expected to have unsatisfactory performance under high-

altitude conditions. Such exemptions will be granted upon petition by the manufacturers that the vehicle falls within the definition of vehicles eligible for exemption. A vehicle shall be considered eligible for exemption if its design parameters (displacement-to-weight ratio (D/W) and engine speed-to-vehicle speed (N/V)) simultaneously fall within the exempted range for that manufacturer for that year. The exempted range is determined according to the following procedure:

(i) The manufacturer shall graphically display the D/W and N/V data of all vehicle configurations it will offer for the model year in question. The axis of the abscissa shall be D/W (where (D) is the engine displacement expressed in cubic centimeters and (W) is the equivalent vehicle test weight expressed in pounds), and the axis of the ordinate shall be N/V (where (N) is the crankshaft speed expressed in revolutions per minute and (V) is the vehicle speed expressed in miles per hour). At the manufacturer's option, either the 1:1 transmission gear ratio or the lowest numerical gear ratio available in the transmission will be used to determine N/V. The gear selection must be the same for all N/V data points on the manufacturer's graph. For each transmission/axle ratio combination, only the lowest N/V value shall be used in the graphical display.

(ii) The product line is then defined by the equation, $N/V=C(D/W)^{-0.9}$, where the constant (C), is determined by the requirement that all the vehicle data points either fall on the line or lie to the upper right of the line as displayed on the graphs.

(iii) The exemption line is then defined by the equation, $N/V=C(0.84\ D/W)^{-0.9}$, where the constant, (C) is the same as that found in paragraph (g)(2)(ii) of this section.

(iv) The exempted range includes all values of N/V and D/W which simultaneously fall to the lower left of the exemption line as drawn on the graph.

(3) The sale of a vehicle for principal use at a designated high-altitude location that has been exempted as set forth in paragraph (g)(2) of this section will be considered a violation of Section 203(a)(1) of the Clean Air Act.

6. In § 86.085–8, the introductory text of paragraph (a)(1) and paragraph (a)(1)(i) are proposed to be revised as follows:

§ 86.085–8 Emission standards for 1985 light-duty vehicles.

(a)(1) Manufacturers may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from 1985 and later model year light-duty vehicles shall be exceed:

(i) *Total hydrocarbons.* 0.41 grams per vehicle mile (0.255 grams per vehicle kilometer). *Non-methane hydrocarbons.* 0.39 grams per vehicle mile (0.243 grams per vehicle kilometer).

* * * * *

7. In § 86.083–9, the introductory text of paragraphs (a)(1) and (d)(1) and paragraphs (a)(1)(i), and (d)(1)(i) are proposed to be revised as follows:

§ 86.083–9 Emission standards for 1983 light-duty trucks.

(a)(1) The standards set forth in paragraphs (a) through (c) of this section shall apply for trucks sold for principal use at other-than-designated high-altitude locations. Manufacturers of light-duty trucks may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from 1983 model year light-duty trucks shall not exceed:

(i) *Total hydrocarbons.* 1.70 grams per vehicle mile (1.058 grams per vehicle kilometer). *Non-methane hydrocarbons.* 1.62 grams per vehicle mile (1.008 grams per vehicle kilometer).

* * * * *

(d)(1) 1983 model year light-duty trucks sold for principal use at designated high-altitude locations shall be capable of meeting the following exhaust emission standards when tested under high-altitude conditions. Manufacturers may elect either a total hydrocarbons standard or a non-methane hydrocarbons emission standard. Exhaust emissions from 1983 high-altitude, light-duty trucks shall not exceed:

(i) *Total hydrocarbons.* 2.0 grams per vehicle mile (1.24 grams per vehicle kilometer). *Non-methane hydrocarbon.* 1.90 grams per vehicle mile (1.18 grams per vehicle kilometer).

* * * * *

8. In § 86.084–9, it is proposed to revise the introductory text of paragraph (a)(1), and paragraph (a)(1)(i) and to remove paragraphs (d) and (e) as follows:

§ 86.084–9 Emission standards for 1984 and later model year light-duty trucks.

(a)(1) Manufacturers of light-duty trucks may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from 1984 model year light-duty trucks shall not exceed:

(i) *Total hydrocarbons.* 0.80 grams per vehicle mile (0.498 grams per vehicle kilometer). *Non-methane hydrocarbons.* 0.76 grams per vehicle mile (0.473 grams per vehicle kilometer).

* * * * *

9. In § 86.084–10, the introductory text of paragraph (a)(1) and paragraph (a)(1)(i) are proposed to be revised as follows:

§ 86.084–10 Emission standards for 1984 and later model year gasoline-fueled heavy-duty engines.

(a)(1) Manufacturers of gasoline-fueled heavy-duty engines may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from new 1984 and later model year gasoline-fueled heavy-duty engines shall not exceed:

(i) *Total hydrocarbons.* 1.3 grams per brake horsepower hour, as measured under transient operating conditions. *Non-methane hydrocarbons.* 1.24 grams per brake horsepower hour as measured under transient operating conditions.

* * * * *

10. In § 86.084–11, the introductory text of paragraph (a)(1) and paragraph (a)(1)(i)(A) are proposed to be revised as follows:

§ 86.084–11 Emission standards for 1984 diesel heavy-duty engines.

(a)(1) Manufacturers of diesel heavy-duty engines may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from new 1984 model year diesel heavy-duty engine shall not exceed:

(i)(A) *Total hydrocarbons.* 1.3 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N). *Non-methane hydrocarbons.* 1.24 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N) or,

* * * * *

11. In § 86.085–11, the introductory text of paragraph (a)(1) and paragraph (a)(1)(i)(A) are proposed to be amended as follows:

§ 86.085–11 Emission standards for 1985 diesel heavy-duty engines.

(a)(1) Manufacturers of diesel heavy-duty engines may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emission from new

1985 model year and later diesel heavy-duty engine shall not exceed:

(i)(A) *Total hydrocarbons.* 1.3 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N). *Non-methane hydrocarbons.* 1.24 grams per brake horsepower hour, as measured under transient operating conditions (Subpart N) or,

* * * * *

12. Section § 86.084–21, paragraph (a) is proposed to be revised as follows:

§ 86.084–21 Application for certification.

(a) A separate application for a certificate of conformity shall be made for each set of standards and each class of new motor vehicles or new motor vehicle engines. Such application shall be made to the Administrator by the manufacturer and shall be updated and corrected by amendment.

* * * * *

13. Paragraph (a)(3)(ii) of § 86.084–29 is proposed to be revised as follows:

§ 86.084–29 Testing by the Administrator.

(a) * * *

(3) * * *

(ii) Whenever the Administrator does not conduct a test on a test vehicle at a test point, the manufacturer's test data will be accepted as the official data for that point: *Provided,* That if the Administrator makes a determination based on testing under paragraph (a)(2) of this section, that there is a lack of correlation between the manufacturer's test equipment and the test equipment used by the Administrator, no manufacturer's test data will be accepted for purposes of certification until the reasons for the lack of correlation are determined and the validity of the data is established by the manufacturer: *And further provided,* That if the Administrator has reasonable basis to believe that any test data submitted by the manufacturer is not accurate or has been obtained in violation of any provisions of this part, the Administrator may refuse to accept that data as the official data pending retesting or submission or further information. If the manufacturer conducts more than one test on a vehicle, as authorized under § 86.084–26(a)(3)(i) or (b)(4)(i) the data from the last test in that series of tests on that vehicle, will constitute the official data.

* * * * *

14. In § 86.084–35, it is proposed to revise paragraphs (a)(1)(iii)(D) and (a)(2)(iii)(D) and to remove paragraphs (a)(1)(iii)(F) and (a) (2) (iii)(G) as follows:

§ 86.084–35 Labeling.

(a) * * *

(1) * * *

(iii) * * *

(D) Engine tune-up specifications and adjustments, as recommended by the manufacturer in accordance with the applicable emission standards, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), high idle speed, initial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any, should be in operation.

* * * * *

(2) * * *

(iii) * * *

(D) Engine tune-up specifications and adjustments, as recommended by the manufacturer in accordance with the applicable emission standards, including but not limited to idle speed(s), ignition timing, the idle air-fuel mixture setting procedure and value (e.g., idle CO, idle air-fuel ratio, idle speed drop), high idle speed, intial injection timing, and valve lash (as applicable), as well as other parameters deemed necessary by the manufacturer. These specifications should indicate the proper transmission position during tune-up and what accessories (e.g., air conditioner), if any should be in operation.

* * * * *

15. A new § 86.111–83 is proposed to read as follows:

§ 86.111–83 Exhaust gas analytical system.

(a) *Schematic drawings.* Figure B 83–1 is a schematic drawing of the exhaust gas analytical system. Figure B 83–2 is a schematic drawing of the instrument to measure methane. The schematic of the hydrocarbon analysis train for diesel fueled vehicles is shown as part of Figure B 82–3 (or Figure B 82–4). Because various configurations can produce accurate results, exact conformance with either drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure B 83–1, consists of a flame ionization detector (FID) for the determination of total hydrocarbons, gas chromatograph (GC) with a flame ionization detector for methane determination (for the non-methane option), non-dispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide, and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. A heated flame ionization detector (HFID) is used for the continuous determination of total hydrocarbons from diesel-fueled vehicles, Figure B 82–3 (or B 82–4). The exhaust gas analytical system shall conform to the following requirements:

BILLING CODE 6560-26-M

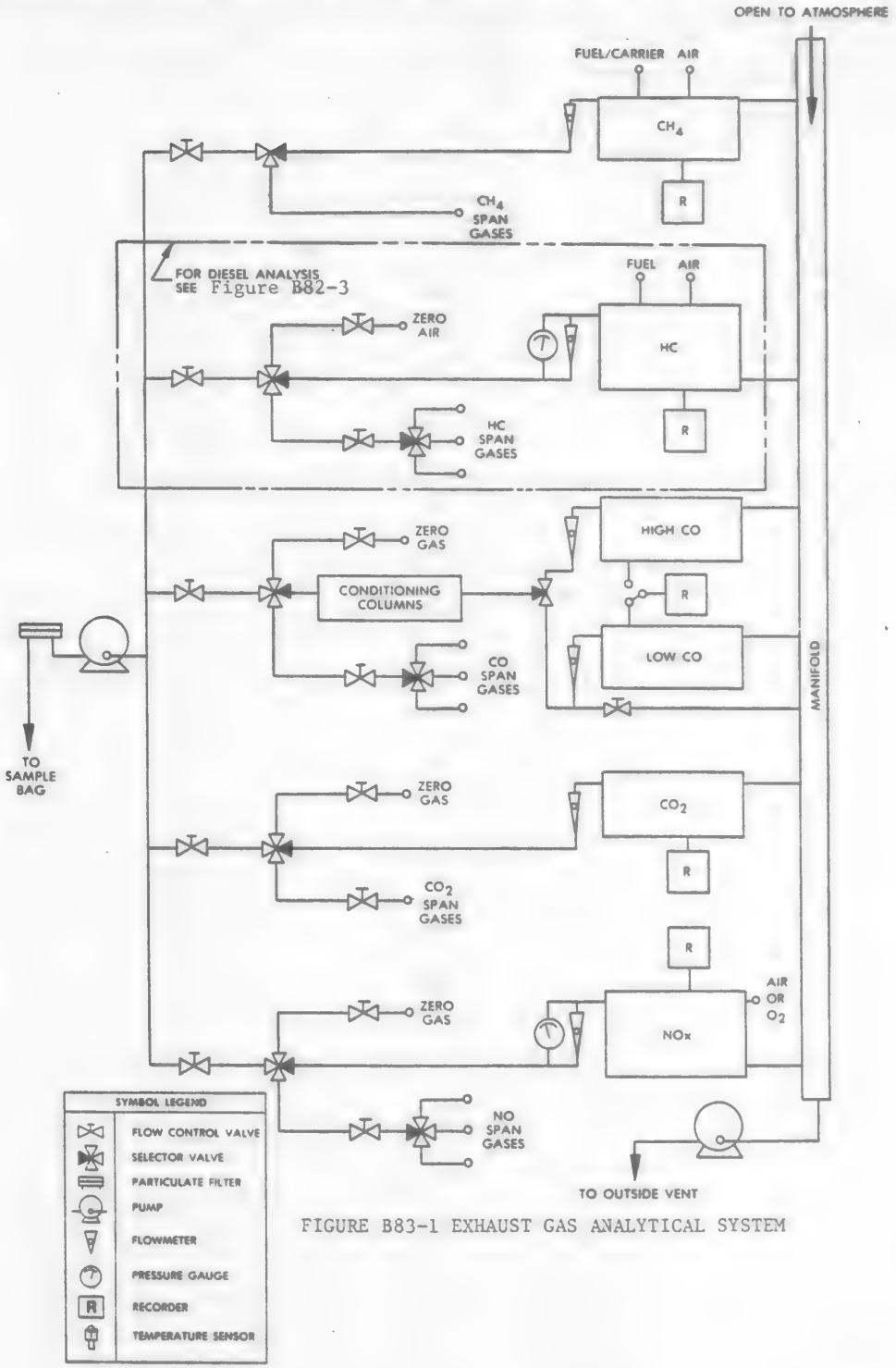

FIGURE B83-1 EXHAUST GAS ANALYTICAL SYSTEM

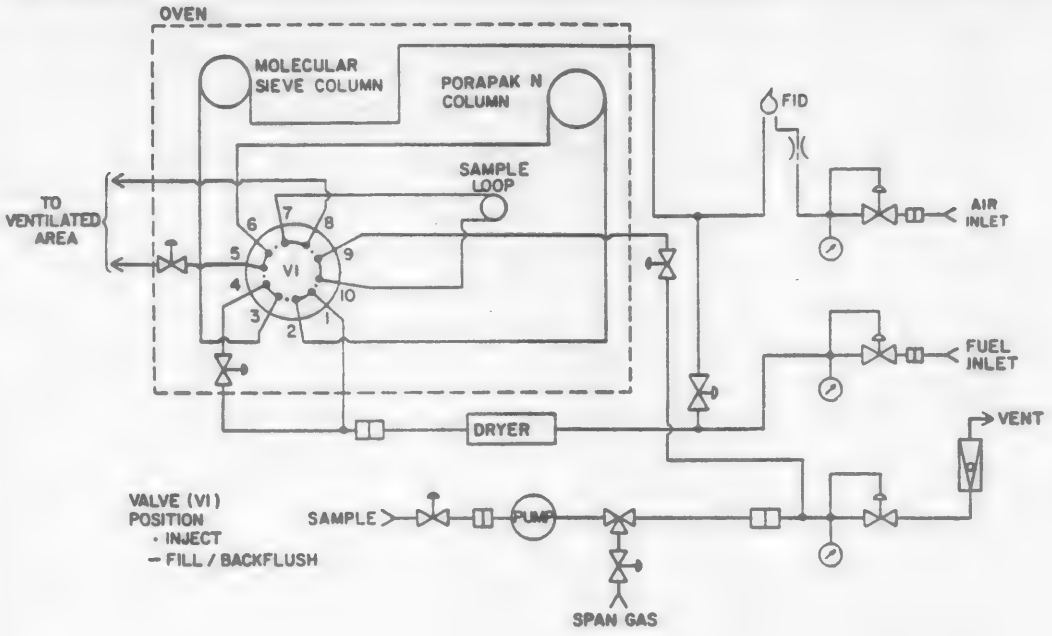

FIGURE B83-2 METHANE ANALYTICAL SYSTEM

BILLING CODE 6560-26-C

(1) The CL requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$ or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted, see § 86.122 and § 86.144.

(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than one percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale, see § 86.122.

(3) For diesel vehicles a continuous total hydrocarbon sample shall be measured using a heated analyzer train as shown in Figure B82–3 (or Figure B82–4). The train shall include a heated probe, a heated continuous sampling line, a heated particulate filter, and a heated total hydrocarbon instrument (HFID) compete with heated pump, filter, and flow control system.

(i) The response time of this instrument shall be less than 1.5 seconds for 90 percent of full scale response.

(ii) Sample transport time from sampling point to inlet of instrument shall be less than four seconds.

(iii) The sample line and filter shall be heated to maintain a sample gas temperature of 375°±10° F (191±6° C) before the filter and before the HFID.

(4) The optional methane analyzer requires a conditioning column (dryer) containing silica gel or molecular sieve material (or an equivalent) to remove water and organic contaminants from the carrier gas stream. The conditioning column shall be reconditioned bimonthly or as necessary by observing a visible indicating medium. The methane impurity of the carrier gas shall not exceed 0.5 ppm methane.

(c) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

16. A new § 86.114–83 is proposed to read as follows:

§ 86.114–83 Analytical gases.

(a) Analyzer gases.

(1) Gases for the CO and CO_2 analyzers shall be single blends of CO and CO_2, respectively, using nitrogen as the diluent.

(2) Gases for the total hydrocarbon analyzer shall be single blends of propane using air as the diluent. Gases for calibration of the optional methan analyzer shall be single blends of methane using air as the diluent.

(3) Gases for NOx analyzer shall be single blends of NO named as NOx, with a maximum NO_2 concentration of 5 percent of the nominal value, using nitrogen as the diluent.

(4) Fuel for the evaporative emission enclosure FID shall be a blend of 40±2% hydrogen with the balance being helium. The mixture shall contain less than 1 ppm equivalent carbon response. Ninety-eight to 100 percent hydrogen fuel may be used with advance approval by the Administrator.

(5) The allowable zero gas (air or nitrogen) impurity concentrations shall not exceed 1 ppm equivalent carbon response, 1 ppm carbon monoxide, 0.04 percent (400 ppm) carbon dioxide and 0.1 ppm nitric oxide.

(6) "Zero grade air" includes artificial "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(7) The use of proportioning and precision blending devices to obtain the required analyzer gas concentration is allowable provided their use been approved in advance by the Administrator.

(b) Calibration gases shall be traceable to within one percent of NBS gas standards, or other gas standards which have been approved by the Administrator.

(c) Span gases shall be accurate to within two percent of true concentration, where true concentration refers to NBS gas standards, or other gas standards which have been approved by the Administrator.

17. A new § 86.116–83 is proposed to read as follows:

§ 86.116–83 Calibrations, frequency and overview.

(a) Calibrations shall be performed as specified in § 86.117 through § 86.126.

(b) At least yearly or after any maintenance which could alter background emission levels, evaporative enclosure background emmission measurements shall be performed.

(c) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the total hydrocarbon analyzers (both evaporative and exhaust emission instruments), optional methane analyzer, carbon dioxide analyzer, carbon monoxide analyzer, and oxides of nitrogen analyzer.

(2) Calibrate the dynamometer. If the dynamometer receives a weekly performance check (and remains within calibration) the monthly calibration need not be performed.

(3) Perform a hydrocarbon retention check and calibration on the evaporative emission enclosure.

(4) Calibrate the gas meters or flow instrumentation used for providing total flow measurement for particulate sampling.

(d) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, and

(2) Perform a CVS system verification.

(3) Run a performance check on the dynamometer. This check may be omitted if the dynamometer has been calibrated within the preceding month.

(e) The CVS positive displacement pump or Critical Flow Vernturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.119).

(f) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

18. A new § 86.125–83 is proposed to read as follows:

§ 86.125–83 Methane analyzer calibration.

The methane analyzer shall receive the following initial and periodic calibration:

(a) *Initial and periodic optimization of detector response.* Prior to its introduction into service and at least annually thereafter the FID detector shall be adjusted for optimum methane response. Alternate methods yielding equivalent results may be used if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions for instrument start-up and basic operating adjustment, using the appropriate fuel, carrier, and zero grade air.

(2) Optimize on the most commonly used range. Introduce into the analyzer a methane in air mixture with a methane concentration equal to approximately 90 percent of the most common range.

(3) Select an operating FID fuel flow rate that will give near maximum response and least variation in response with minor variations in fuel flow rate.

(4) To determine the optimum FID air flow rate, use the FID fuel flow setting determined above and vary air flow rate for maximum response.

(5) After the optimum flow conditions have been determined, actual flow rates are measured and recorded for future reference.

(b) *Initial and periodic calibration.* Prior to its introduction into service and at least monthly thereafter the methane analyzer shall be calibrated on all normally used ranges. Use the same flow rates when analyzing samples.

(1) Adjust analyzer to optimum flow conditions as determined above.

(2) Obtain a stable baseline reading using carrier gas.

(3) Calibrate on each normally used operating range with methane in air calibration gases having nominal concentrations of 15, 30, 60 and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2 percent or less, or within 0.1 ppm methane of the value of each data point (excluding zero), a linear equation may be used to determine the methane concentration. If the deviation exceeds 2 percent or 0.1 ppm methane at any data point (whichever is highest), the best fit non-linear equation which represents the data to within 2 percent (or 0.1 ppm methane) of each point shall be used to determine the concentration. Use methane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of each range for the calibration of non-linear instruments.

(4) A stable baseline must be obtained before and after the methane peak elution. A stable baseline is defined as the time equal to or greater than 25 percent of the methane peak width at half peak height. The methane peak must be resolved from other gases, such as oxygen, nitrogen, and carbon monoxide. Methane concentration shall be determined by peak height measurement or area integration.

19. A new § 86.140–83 is proposed to read as follows:

§ 86.140–83 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each series of measurements:

(a) Gasoline fueled vehicles. Total hydrocarbons, CH (non-methane option), CO, CO_2 and NO_x.

(1) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(2) Introduce span gases and set instrument gains. In order to avoid errors, span and calibrate at the same flow rates used to analyze the test sample. Span gases should have concentrations equal to 75 to 100 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. Show actual concentrations on chart.

(3) Check zeros; repeat the procedure in paragraphs (a) (1) and (2) of this section if required.

(4) Check flow rates and pressures.

(5) Measure: THC CH_4 (non-methane option), CO, CO_2 and NOx concentrations of samples.

(6) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a)(1) through (5) of this section.

(b) For diesel fueled vehicles, follow procedures for gasoline fueled vehicles except THC.

(1) Zero HFID analyzer and obtain a stable zero reading.

(2) Introduce span gas and set instrument gains. Span gas should have concentration equal to 75 to 100 percent of full scale.

(3) Check zero as in paragraph (b)(1) of this section.

(4) Introduction of zero and span gas into the analyzer can be accomplished by either of the following methods:

(i) Close heated valve in THC sample (see Figures B82–3 or B82–4), and allow gases to enter HFID. Extreme care should be taken not to introduce gases under high pressure.

(ii) Connect zero and span line directly to THC sample probe and introduce gases at a flow rate between 190 percent and 210 percent of the HFID flow rate (see Figures B82–3A or B82–4A). Excess flow must be allowed to exit probe inlet.

Note.—In order to minimize errors, HFID flow rate and pressure during zero and span (and background bag reading) must be exactly the same as that used during testing.

(5) Continuously record (integrate electronically if desired) dilute total hydrocarbon emissions levels during test. Background samples are collected in sample bags and analyzed as in paragraph (b)(4)(i) or (4)(ii) of this section.

(6) Check zero and span as in paragraph (b)(1) through (b)(4)(i) or (4)(ii) of this section. If difference is greater than two percent of full scale, void test and check for HC "hangup" or electronic drift in analyzer.

20. A new § 86.144–83 is proposed to read as follows:

§ 86.144–83 Calculations, exhaust emissions.

The final reported test results shall be computed by use of the following formula:

(a) For light-duty vehicles and light-duty trucks:

$$Y_{wm}=0.43[(Y_{ct}+Y_s)/(D_{ct}+D_s)]+0.57[(Y_{ht}+Y_s)/(D_{ht}+D_s)]$$

Where:

Y_{wm} = Weighted mass emissions of each pollutant, e.g., total HC or NMHC, CO, CO_2, or NO_x, in grams per vehicle mile.

Y_{ct} = Mass emissions as calculated from the "transient" phase of the cold start test, in grams per test phase.

Y_{ht} = Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.

Y_s = Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.

D_{ct} = The measured driving distance from the "transient" phase of cold start test, in miles.

D_{ht} = The measured driving distance from the "transient" phase of the hot start test, in miles.

D_s = The measured driving distance from the "stabilized" phase of the cold start test, in miles.

(b) The mass of each pollutant for each phase of both the cold start test and the hot start test is determined from the following:

(1)(i) Total Hydrocarbon mass:

$$THC_{mass}=V_{mix}\times Density_{THC}\times(THC_{conc}/1{,}000{,}000)$$

(ii) Non-methane Hydrocarbon mass:

$$NMHC_{mass}=(THC_{mass})-(CH_{4\,mass})=(THC_{mass})-(V_{mix}\times Density_{CH4}\times(CH_{4\,conc}/1{,}000{,}000))$$

(2) Oxides of nitrogen mass:

$$Nox_{mass}=V_{mix}\times Density_{NOx}\times K_H\times(NO_{x\,conc}/1{,}000{,}000)$$

(3) Carbon monoxide mass:

$$CO_{mass}=V_{mix}\times Density_{CO}\times(CO_{conc}/1{,}000{,}000)$$

(4) Carbon dioxide mass:

$$CO_{2mass}=V_{mix}\times Density_{CO2}\times(CO_{2conc}/100)$$

(c) Meaning of symbols:

(1)(i) THC_{mass} = total hydrocarbon emissions, in grams per test phase.

$Density_{THC}$ = Density of total hydrocarbons is 16.33 g/ft³ (0.5767 kg/m³), assuming an average carbon to hydrogen ratio of 1:1.185, at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

THC_{conc} = Total Hydrocarbon concentration of the dilute exhaust sample corrected for total hydrocarbon background, in ppm carbon equivalent, i.e., equivalent propane X 3.

$$THC_{conc}=THC_e-THC_d(1\text{-}1/DF)$$

(ii) $NMHC_{mass}$ = Total hydrocarbon emissions less methane emissions, in grams per test phase.

Density C_3H_4=Density of methane is 18.89 g/ft³ (0.6671 kg/m) at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

CH_{4conc}=Methane concentration in the dilute exhaust sample corrected for methane background in ppm carbon.

$CH_{4conc}=CH_{4e}-CH_{4d}$ (1-1/DF)

Where

THC_e = Total hydrocarbon concentration of the dilute exhaust sample or, for Diesel vehicles, average total hydrocarbon concentration of the dilute exhaust sample as calculated from the integrated total HC traces, in ppm carbon equivalent.

THC_d=Total Hydrocabon concentration of the dilution air as measured, in ppm carbon equivalent.

CH_{4e}=Methane concentration of the dilute exhaust sample in ppm carbon equivalent.

CH_{4d}=Methane concentration of the dilution air as measured in ppm carbon equivalent.

(2) NOx_{mass}=Oxides of nitrogen emissions, in grams per test phase.

Density $_{NOx}$=Density of oxides of nitrogen in 54.16 g/ft³ (1.913 kg/m³), assuming they are in the form of nitrogen dioxide, at 68°F (20°C) and 760 mm HG (101.3 kPa) pressure.

NO_{xconc}=Oxides of nitrogen concentration of the dilute exhaust sample corrected for background in ppm.

$NO_{xconc}=NO_{xe}-NO_{xd}$ (1-1/DF)

Where:

NO_{xe}=Oxides of nitrogen concentration of the dilute exhaust sample as measured, in ppm. NO_{xd}=Oxides of nitrogen concentration of the dilution air as measured in ppm.

(3) CO_{mass}=Carbon monoxide emissions, in grams per test phase.

Density$_{CO}$=Density of carbon monoxide is 32.97 g/ft³ (1.164 kg/m³) at 68°F (20°C) and 760 mm Hg (101.3 kPA) pressure.

CO_{conc}=Carbon monoxide concentration of the dilure exhaust sample corrected for background, water vapor, and CO_2 extraction, in ppm.

$CO_{conc}=CO_e-CO_d$ (1-1/DF)

Where:

CO_e=Carbon monoxide concentration of the dilute exhaust sample volume corrected for water vapor and carbon dioxide extraction, in ppm. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$CO_e=(1-0.01925\ CO_{2e}-0.000323\ R)\ CO_{em}$

Where:

CO_{em}=Carbon monoxide concentration of the dilute exhaust sample as measured, in ppm.

CO_{2e}=Carbon dioxide concentration of the dilute exhaust sample, in percent.

R=Relative humidity of the dilution air, in percent (see § 86.142(n)).

CO_d=Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in ppm.

$CO_d=(1-0.000323R)\ C)_{dm}$

Where:

CO_{dm}=Carbon monoxide concentration of the dilution air sample as measured, in ppm.

Note.—If a CO instrument which meets the criteria specified in § 86.111 is used and the conditioning column has been deleted, CO_{em} can be substituted directly for CO_e, and CO_{dm} can be substituted directly for CO_d.

(4) CO_{2mass}=Carbon dioxide emissions, in grams per test phase.

Density CO_2=Density of carbon dioxide is 51.85 g/ft³ (1.843 kg/m³) at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

CO_{2conc}=Carbon dioxide concentration of the dilute exhaust sample corrected for background, in percent.

$CO_{2conc}=CO_{2e}-CO_{2d}$ (1-1/DF)

Where:

CO_{2d}=Carbon dioxide concentration of the dilution air as measured, in percent.

(5) $DF=13.4/[CO_{2e}+(HC_eCO_e)\ 10^{-4}]$

K_H=Humidity correction factor.

$K_H=1/[1-0.0047\ (H-75)]$

for SI units $K_H=1/[1-0.0329\ (H-10.71)]$

Where:

H=Absolute humidity in grains (grams) of water per pound (kilogram) of dry air.

$H=[(43.478)\ R_a\times P_d]/[P_B-(P_d\times R_a/100)]$

for SI Units, $H=[(6.211)R_a\times P_d]/[P_B-(P_d\times R_a/100)]$

R_a=Relative humidity of the ambient air, in percent.

P_d=Saturated vapor pressure, in mm Hg (kPa) at the ambient dry bulb temperature.

P_B=Barometric pressure, in mm Hg (kPa).

V_{mix}=Total dilute exhaust volume in cubic feet per test phase corrected to standard conditions (528°R) (293°K) and 760 mm Hg (101.3 kPa)).

For PDP-CVS, V_{mix} is:

$$V_{mix\times}=\frac{V_o\times N(P_B\times P_a)\ (528°R)}{(760\text{ mm Hg})\ (T_p)}$$

for SI units,

$$V_{mix}=\frac{V_o\times N(P_B-P_a)\ (293.15°K)}{(101.325\text{ kPa})\ (T_p)}$$

Where:

V_o=Volume of gas pumped by the positive displacement pump, in cubic feet (m³) per revolution. This volume is dependent on the pressure differential across the positive displacement pump.

N=Number of revolutions of the positive displacement pump diring the test phase while samples are being collected.

P_B=Barometric pressure, in mm Hg (kPa).

P_a=Pressure depression below atmospheric measured at the inlet to the positive displacement pump, in mm Hg (kPa) (during an idle mode).

T_p=Average temperature of dilute exhaust entering positive displacement pump during test, °R(°K).

(d) Example calculation of mass values of exhaust emissions using positive displacement pump:

(1) For the "transient" phase of the cold start test assume the following: V_o=0.29344 ft³/revolution; N=10,485; R=48.0 percent; R_a=48.2 percent; P_B=762 mm Hg; P_d=22.225 mm Hg; P_a=70 mm Hg; T_p=570°R; THC_e=105.8 ppm, carbon equivalent; CH_{4e}=21.2 ppm; NOx_e=11.2 ppm; CO_{em}=306.6 ppm; CO_{2e}=1.43 percent; THC_d=12.1 ppm; CH_{4d}=1.8 ppm; NOx_d=0.8 ppm; CO_{dm}=15.3 ppm; CO_{2d}=0.032 percent; D_{ct}=3.598 miles.

Then:

$V_{mix}=(0.29344)\ (10.485)\ (762-70)\ (528)/(760)\ (570)=2595.0$ ft³ per test phase.

$H=(43.478)\ (48.2)\ (22.225)/[762-(22.225\times48.2/100]=62$ grains of water per pound of dry air.

$K_H=1/[1-0.0047\ (62-75)]=0.9424$

$CO_e=[1-0.01925\ (1.43)-0.000323\ (48)]\ 306.0=293.4$ ppm

$CO_d=[1-0.000323\ (48)]\ 15.3=15.1$ ppm

$DF=13.4/[1.43+(105.8+293.4)\times10^{-4}]=9.116$

$THC_{conc}=105.8-12.1\ (1-1/9.116)=95.03$ ppm

$THC_{mass}=(2595.0)\ (16.33)\ (95.03/1,000,000)=4.027$ grams per test phase

$CH_{4conc}=21.2-1.8(1-1/9.116)=19.60$ ppm

$CH_{4mass}=(2595.0)\ (18.89)\ (19.60/1,000,000)=0.961$ grams per test phase

$NMHC_{mass}=4.027-0.961=3.066$ grams per test phase

$NOx_{conc}=11.2-0.8\ (1-1/9.116)=10.49$ ppm

$NOx_{mass}=(2595.0)\ (54.16)\ (10.49/1,000,000)\ (0.9424)=1.389$ grams per test phase

$CO_{conc}=293.4-15.1\ (1-1/9.116)=280.0$ ppm

$CO_{mass}=(2595.0)\ (32.97)\ (280.0/1,000,000)=23.96$ grams per test phase

$CO_{2conc}=1.43-0.032\ (1-1/9.116)=1.402$ percent

$CO_{2mass}=(2595.0)\ (51.85)\ (1.402/100)=1886$ grams per test phase

(2) For the stabilized portion of the cold start test assume that similar calculations resulted in the following:

$THC_{mass}=0.62$ grams per test phase

$NMHC_{mass}=0.50$ grams per test phase

$NOx_{mass}=1.27$ grams per test phase

$CO_{mass}=5.98$ grams per test phase

$CO_{2mass}=2346$ grams per test phase

$D_s=3.902$ miles

(3) For the "transient" portion of the hot start test assume that similar calculations resulted in the following:

$THC_{mass}=0.51$ grams per test phase

$NMHC_{mass}=0.41$ grams per test phase

$NOx_{mass}=1.38$ grams per test phase

$CO_{mass}=5.01$ grams per test phase

$CO_{2mass}=1758$ grams per test phase

$D_{ht}=3.598$ miles

(4) Weighted mass emission results:

$THC_{wm}=0.43\ [(4.027+0.62)/(3.598+3.902)]+0.57\ [(0.51+0.62)/(3.598+3.902)]=0.352$ grams total hydrocarbon per vehicle mile

$NMHC_{wm}=0.43\ [(3.066+0.50)/(3.598+3.902)]+0.57\ [(0.41+0.50)/(3.598+3.902)]=0.274$ grams per vehicle mile

$NOx_{wm}=0.43\ [(1.38+1.27)/(3.598+3.902)]+0.57\ [(1.38+1.27)/(3.598+3.902)]=0.354$ grams per vehicle mile

$CO_{wm}=0.43\ [(23.96+5.98)/(3.598+3.902)$: $+0.57[5.01+5.98)/(3.598+3.902)]=2.55$ grams per vehicle mile

CO_{2wm}=0.43 [(1866+2346)/(3.598+3.902)]+0.57 [(1758+2346)/(3.598+3.902)]=555 grams per vehicle mile.

21. A new § 86.402–83 is proposed to read as follows:

§ 86.402–83 Definitions.

The following definitions apply beginning with the 1983 model year. Section 86.402–78 remains effective.

"Hydrocarbon(s)" (HC) and "total hydrocarbon(s)" (THC) means those substances as determined by a flame ionization detector (FID) as specified in: (1) § 86.111–82 for Light-Duty Vehicles and Light-Duty Trucks; (2) § 86.1309–84, § 86.1310–84, § 86.1311–84 for Heavy-Duty Engines; and (3) § 86.511–78 for Motorcycles.

"Non-methane hydrocarbon(s)" (NMHC) means those substances defined as hydrocarbon(s) or total hydrocarbon(s) less that part which is methane.

22. A new § 86.403–83 is proposed to read as follows:

§ 86.403–83 Abbreviations.

The abbreviations used in this subpart have the following meanings in both capital and lowercase:

ASTM—American Society for Testing and Materials.
C—Celsius.
cc—Cubic centimetre(s).
cfh—Cubic feet per hour.
cfm—Cubic feet per minute.
CH_4—Methane.
cm—Centimetre(s).
CO—Carbon monoxide.
CO_2—Carbon dioxide.
Conc—Concentration.
cu.—Cubic.
CVS—Constant volume sampler.
EGR—Exhaust gas recirculation.
EP—End point.
EPA—Environmental Protection Agency.
F—Fahrenheit.
GC—Gas chromatograph.
h—hour.
HC—Hydrocarbon(s).
Hg—Mercury.
H_2O—Water.
in.—Inch(es).
K—Kelvin.
kg—Kilogram(s).
km—Kilometre(s).
kpa—Kilopascal(s).
lb—Pound(s).
m—Metre(s).
mph—Miles per hour.
mm—Millimetre(s).
N_2—Nitrogen.
NMHC—Non-methane hydrocarbon(s).
NOx—Oxides of nitrogen.
No.—Number.
O_2—Oxygen.
Pa—Pascal(s).
Pb—lead.
ppm—Parts per million by volume.
psi—Pounds per square inch.
psig—Pounds per square inch gauge.
R—Rankine.
rpm—Revolutions per minute.
THC—Total hydrocarbon(s).
wt—Weight.
°—Degree(s).
%—Percent.

23. A new § 86.410–83 is proposed to read as follows:

§ 86.410–83 Emission standards for 1983 motorcycles.

(a)(1) Manufacturers of motorcycles may elect either a total hydrocarbons exhaust emission standard or a non-methane hydrocarbons exhaust emission standard. Exhaust emissions from 1983 and later model year motorcycles shall not exceed:

(i) *Total hydrocarbons.* 5.0 grams per vehicle kilometer. *Non-methane hydrocarbons.* 4.75 grams per vehicle kilometer.

(ii) *Carbon monoxide.* 12 grams per vehicle kilometer.

(2) The standards set forth in paragraph (a)(1) of this section refer to the exhaust emitted over driving schedules as set forth in Subpart F and measured and calculated in accordance with those procedures.

(b) No crankcase emissions shall be discharged into the ambient atmosphere from any new motorcycle subject to this subpart.

24. A new § 86.502–83 is proposed to read as follows:

§ 86.502–83 Definitions.

The definitions in § 86.402–78 and § 86.402–83 apply to this subpart.

25. A new § 86.503–83 is proposed to read as follows:

§ 86.503–83 Abbreviations.

The abbreviations in § 86.403–78 and § 86.403–83 apply to this subpart.

26. A new § 86.511–83 is proposed to read as follows:

§ 86.511–83 Exhaust gas analytical system.

(a) *Schematic drawings.* Figure F 83–1 is a schematic drawing of the exhaust gas analytical system. Figure F 83–2 is a schematic drawing of the instrument to measure methane. Because various configurations can produce accurate results, exact conformance with either drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure F 83–1, consists of a flame ionization detector (FID) for the determination of total hydrocarbons, gas chromatograph (GC) with a flame ionization detector for methane determination (for the non-methane option), non-dispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide, and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. The exhaust gas analytical system shall conform to the following requirements:

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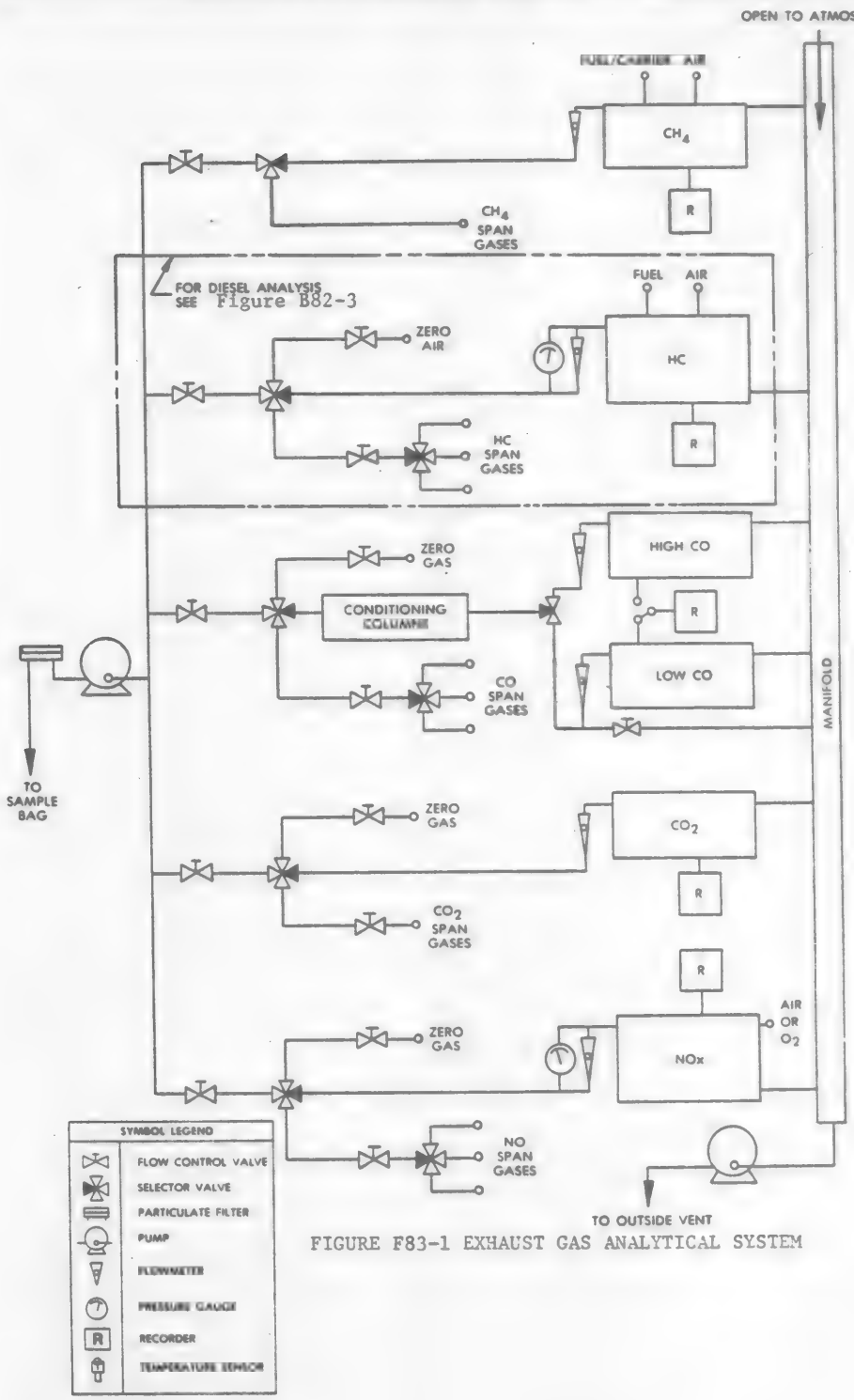

FIGURE F83-1 EXHAUST GAS ANALYTICAL SYSTEM

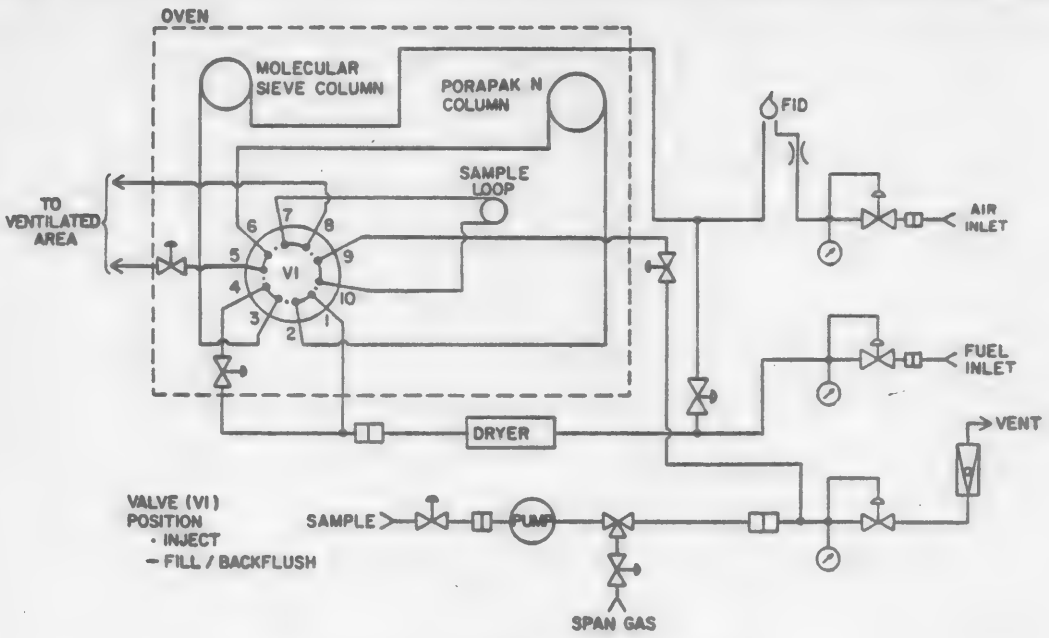

FIGURE F83-2 METHANE ANALYTICAL SYSTEM

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(1) The CL requires that the nitrogen dioxide present in the sample be converted to nitric oxide before analysis. Other types of analyzers may be used if shown to yield equivalent results and if approved in advance by the Administrator.

(2) The carbon monoxide (NDIR) analyzer may require a sample conditioning column containing $CaSO_4$, or indicating silica gel to remove water vapor and containing ascarite to remove carbon dioxide from the CO analysis stream.

(i) If CO instruments which are essentially free of CO_2 and water vapor interference are used, the use of the conditioning column may be deleted, see §§ 86.522 and 86.544.

(ii) A CO instrument will be considered to be essentially free of CO_2 and water vapor interference if its response to a mixture of 3 percent CO_2 in N_2 which has been bubbled through water at room temperature produces an equivalent CO response, as measured on the most sensitive CO range, which is less than one percent of full scale CO concentration on ranges above 300 ppm full scale or less than 3 ppm on ranges below 300 ppm full scale, see § 86.522.

(3) The optional methane analyzer requires a conditioning column (dryer) containing silica gel or molecular sieve material (or an equivalent) to remove water and organic contaminants from the carrier gas stream. The conditioning column shall be reconditioned bimonthly or as necessary by observing a visible indicating medium. The methane impurity of the carrier gas shall not exceed 0.5 ppm methane.

(c) *Other analyzers and equipment.* Other types of analyzers and equipment may be used if shown to yield equivalent results and if approved in advance by the Administrator.

27. A new § 86.514–83 is proposed to read as follows:

§ 86.514–83 Analytical gases.

(a) Analyzer gases.

(1) Gases for the CO and CO_2 analyzers shall be single blends of CO and CO_2 respectively using nitrogen as the diluent.

(2) Gases for the total hydrocarbon analyzer shall be single blends of propane using air as the diluent. Gases for calibration of the optional methane analyzer shall be single blends of methane using air as the diluent.

(3) Gases for the NOx analyzer shall be single blends of NO named as NOx, with a maximum NO_2 concentration of five percent of the nominal value, using nitrogen as the diluent.

(4) Fuel for the evaporative emission enclosure FID shall be a blend of 40±2% hydrogen with the balance being helium. The mixture shall contain less than 1 ppm equivalent carbon response. Ninety-eight to 100 percent hydrogen fuel may be used with advance approval by the Administrator.

(5) The allowable zero gas (air or nitrogen) impurity concentrations shall not exceed 1 ppm equivalent carbon response, 1 ppm carbon monoide, 0.04 percent (400 ppm) carbon dioxide and 0.1 ppm nitric oxide.

(6) "Zero grade air" includes artifical "air" consisting of a blend of nitrogen and oxygen with oxygen concentrations between 18 and 21 mole percent.

(7) The use of proportioning and precision blending devices to obtain the required analyzer gas concentration is allowable provided their use has been approved in advance by the Administrator.

(b) Calibration gases shall be traceable to within one percent of NBS gas standards, or other gas standards which have been approved by the Administrator.

(c) Span gases shall be accurate to within two percent of true concentration, where true concentration refers to NBS gas standards, or other gas standards which have been approved by the Administrator.

28. A new § 86.516–83 is proposed to read as follows:

§ 86.516–83 Calibrations, frequency and overview.

(a) Calibrations shall be performed as specified in §§ 86.517 through 86.526.

(b) [Reserved]

(c) At least monthly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Calibrate the total hydrocarbon analyzer, optional methane analyzer, carbon dioxide analyzer, carbon monoxide analyzer, and oxides of nitrogen analyzer.

(2) Calibrate the dynamometer. If the dynamometer receives a weekly performance check (and remains within calibration) the monthly calibration need not be performed.

(d) At least weekly or after any maintenance which could alter calibration, the following calibrations and checks shall be performed:

(1) Check the oxides of nitrogen converter efficiency, and

(2) Perform a CVS system verification.

(3) Run a performance check on the dynamometer. This check may be omitted if the dynamometer has been calibrated within the preceding month.

(e) The CVS positive displacement pump or Critical Flow Venturi shall be calibrated following initial installation, major maintenance or as necessary when indicated by the CVS system verification (described in § 86.119).

(f) Sample conditioning columns, if used in the CO analyzer train, should be checked at a frequency consistent with observed column life or when the indicator of the column packing begins to show deterioration.

29. A new section 86.525–83 is proposed to read as follows:

§ 86.525–83 Methane analyzer calibration.

The methane analyzer shall receive the following initial and periodic calibration:

(a) *Initial and periodic optimization of detector response.* Prior to its introduction into service and at least annually thereafter the FID detector shall be adjusted for optimum methane response. Alternate methods yielding equivalent results may be used if approved in advance by the Administrator.

(1) Follow the manufacturer's instructions for instrument start-up and basic operating adjustment, using the appropriate fuel, carrier, and zero grade air.

(2) Optimize on the most commonly used range. Introduce into the analyzer a methane in air mixture with a methane concentration equal to approximately 90 percent of the most common range.

(3) Select an operating FID fuel flow rate that will give near maximum response and least variation in response with minor variations in fuel flow rate.

(4) To determine the optimum FID air flow rate, use the FID fuel flow setting determined above and vary air flow rate for maximum response.

(5) After the optimum flow conditions have been determined, actual flow rates are measured and recorded for future reference.

(b) *Initial and periodic calibration.* Prior to its introduction into service and at least monthly thereafter the methane analyzer shall be calibrated on all normally used ranges. Use the same flow rates when analyzing samples.

(1) Adjust analyzer to optimum flow conditions as determined above.

(2) Obtain a stable baseline reading using carrier gas.

(3) Calibrate on each normally used operating range with methane in air calibration gases having nominal concentrations of 15, 30, 60 and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line

is two percent or less, or within 0.1 ppm methane of the value of each data point (excluding zero), a linear equation may be used to determine the methane concentration. If the deviation exceeds two percent or 0.1 ppm methane at any data point (whichever is highest), the best fit non-linear equation which represents the data to within two percent (or 0.1 ppm methane) of each point shall be used to determine the concentration. Use methane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of each range for the calibration of non-linear instruments.

(4) A stable baseline must be obtained before and after the methane peak elution. A stable baseline is defined as the time equal to or greater than 25 percent of the methane peak width at half peak height. The methane peak must be resolved from other gases, such as oxygen, nitrogen, and carbon monoxide. Methane concentration shall be determined by peak height measurement or area integration.

30. A new § 86.540–83 is proposed to read as follows:

§ 86.540–83 Exhaust sample analysis.

The following sequence of operations shall be performed in conjunction with each seies of measurements:

(a) Check flowrates and pressures. Adjust if required.

(b) Zero the analyzers and obtain a stable zero reading. Recheck after tests.

(c) Introduce span gases and set instrument gains. In order to avoid errors, span and calibrate at the same flow rates used to analyze the test sample. Span gases should have concentrations equal to 75 to 100 percent of full scale. If gain has shifted significantly on the analyzers, check the calibrations. show actual concentrations on chart.

(d) Check zeros; repeat the procedure in paragraphs (a) through (c) of this section if required.

(e) Check flow rates and pressures.

(f) Measure; THIC, CH_4 (non-methane option), CO, CO_2 and, optionally, NO_x concentrations of samples.

(g) [Reserved]

(h) Check zero and span points. If difference is greater than 2 percent of full scale, repeat the procedure in paragraphs (a) through (g) of this section.

31. A new § 86.544–83 is proposed to read as follows:

§ 86.544–83 Calculations, exhaust emissions.

The final reported test results, with oxides of nitrogen being optional, shall be computed by use of the following formulae:

(a) $Y_{wm} = 0.43\ [(Y_{ct} + Y_s)/(D_{ct} + D_s)] + 0.57\ [(Y_{ht} + Y_s)/(D_{ht} + D_s)]$

Where:

Y_{wm} = Weighted mass emission of each pollutant, e.g., total HC or NMHC, CO, CO_2, or NO_x, in grams per vehicle kilometer.

Y_{ct} = Mass emission as calculated from the "transient" phase of the cold start test, in grams per test phase.

Y_{ht} = Mass emissions as calculated from the "transient" phase of the hot start test, in grams per test phase.

Y_s = Mass emissions as calculated from the "stabilized" phase of the cold start test, in grams per test phase.

D_{ct} = The measured driving distance from the "transient" phase of the cold start test, in kilometers.

D_{ht} = The measured driving distance from the "transient" phase of the hot start test, in kilometers.

D_s = The measured driving distance from the "stabilized" phase of the cold start test, in kilometers.

(b) The mass of each pollutant for each phase of both the cold start test and the hot start test is determined from the following:

(1,)(i) Total Hydrocarbon mass:

$THC_{mass} = V_{mix} \times Density_{THC} \times (THC_{conc}/1{,}000{,}000)$

(ii) Non-methane Hydrocarbon mass:

$NMHC_{mass} = (THC_{mass}) - (CH_{4\ mass}) = (THC_{mass}) - (V_{mix} \times Density_{CH4} \times (CH_{4\ conc}/1{,}000{,}000))$

(2) Oxides of nitrogen mass:

$NO_{x\ mass} = V_{mix} \times Density_{NO2} \times K_H \times (NO_{x\ conc}/1{,}000{,}000))$

(3) Carbon monoxide mass:

$CO_{mass} = V_{mix} \times Density_{CO} \times (C_{conc}/1{,}000{,}000)$

(4) Carbon dioxide mass:

$CO_{2\ mass} = V_{mix} \times Density_{CO2} \times (CO_{2\ conc}/100)$

(c) Meaning of symbols:

(1)(i) THC_{mass} = total Hydrocarbon emissions, in grams per test phase.

$Density_{THC}$ = Density of total hydrocarbons is 16.33 g/ft³ (0.5767 kg/m³), assuming an average carbon to hydrogen ratio of 1:1.85, at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

THC_{conc} = Total Hydrocarbon concentration of the dilute exhaust sample corrected for total hydrocarbon background, in ppm carbon equivalent, i.e., equivalent propane X 3.

$THC_{conc} = THC_e - THC_d\ (1\text{–}1/DF)$

(ii) $NMHC_{mass}$ = Total hydrocarbon emissions less methane emissions, in grams per test phase.

$Density_{CH4}$ = Density of methane is 18.89 g/ft³ (0.6671 kg/m³) at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

CH_{4conc} = Methane concentration in the dilute exhaust sample corrected for methane background in ppm carbon.

$CH_{4conc} = CH_{4e} - CH_{4d}\ (1\text{–}1/DF)$

Where:

THC_e = Total Hydrocarbon concentration of the dilute exhaust sample or, for diesel vehicles, average total hydrocarbon concentration of the dilute exhaust sample as calculated from the integrated total HC traces, in ppm carbon equivalent.

THC_d = Total hydrocarbon concentration of the dilution air as measured, in ppm carbon equivalent.

CH_{4e} = methane concentration of the dilute exhaust sample in ppm carbon equivalent.

CH_{4d} = methane concentration of the dilution air as measured in ppm carbon equivalent.

(2) NO_{xmass} = Oxides of nitrogen emissions, in grams per test phase.

$Density_{NO2}$ = Density of oxides of nitrogen is 54.16 g/ft³ (1.913 kg/m³), assuming they are in the form of nitrogen dioxide, at 68° F (20° C) and 760 mm HG (101.3 kPa) pressure.

NO_{xconc} = Oxides of nitrogen concentration of the dilute exhaust sample corrected for background in ppm.

$NO_{xconc} = NO_{xe} - NO_{xd}\ (1\text{–}1/DF)$

Where:

NO_{xe} = Oxides of nitrogen concentration of the dilute exhaust sample as measured, in ppm.

NO_{xd} = Oxides of nitrogen concentration of the dilution air as measured in ppm.

(3) CO_{mass} = Carbon monoxide emissions, in grams per test phase.

$Density_{CO}$ = Density of carbon monoxide is 32.97 g/ft³ (1.164 kg/m³) at 68° F (20° C) and 760 mm Hg (101.3 kPA) pressure.

CO_{conc} = Carbon monoxide concentration of the dilute exhaust sample corrected for background, water vapor, and CO_2 extraction, in ppm.

$CO_{conc} = CO_e - CO_d\ (1\text{–}1/DF)$

Where:

CO_e = Carbon monoxide concentration of the dilute exhaust sample volume corrected for water vapor and carbon dioxide extraction, in ppm. The calculation assumes the carbon to hydrogen ratio of the fuel is 1:1.85.

$CO_e = (1\text{–}0.01925\ CO_{2e} - 0.000323\ R)\ CO_{em}$

Where:

CO_{em} = Carbon monoxide concentration of the dilute exhaust sample as measured, in ppm.

CO_{2e} = Carbon dioxide concentration of the dilute exhaust sample, in percent.

R = Relative humidity of the dilution air, in percent (see § 86.542–78(n)).

CO_d = Carbon monoxide concentration of the dilution air corrected for water vapor extraction, in ppm.

$CO_d = (1\text{–}0.000323R)\ CO_{dm}$

Where:

CO_{dm} = Carbon monoxide concentration of the dilution air sample as measured, in ppm.

Note.—If a CO instrument which meets the criteria specified in § 86.511 is used and the

conditioning column has been deleted, CO_{em} can be substituted directly for CO_e, and CO_{dm} can be substituted directly for CO_d.

(4) CO_{2mass} = Carbon dioxide emissions, in grams per test phase.

Density CO_2 = Density of carbon dioxide is 51.85 g/ft³ (1.843 kg/m³) at 68° F (20° C) and 760 mm Hg (101.3 kPa) pressure.

CO_{2conc} = Carbon dioxide concentration of the dilute exhaust sample corrected for background, in percent.

$CO_{2conc} = CO_{2e} - CO_{2d}$ (1-1/DF)

Where:

CO_{2d} = Carbon dioxide concentration of the dilution air as measured, in percent.

(5) $DF = 13.4/[CO_{2e} + (HC_e + CO_e)10^{-4}]$

K_H = Humidity correction factor.

$K_H = 1/[1-0.0047\ (H-75)]$

for SI units $K_H = 1/[1-0.0329(H-10.71)]$

Where:

H = Absolute humidity in grains (grams) of water per pound (kilogram) of dry air.

$H = [(43.478)R_a \times P_d]/[P_B - (P_d \times R_a/100)]$

for SI Units, $H = [(6.211)R_a \times P_d]/[P_B - (P_d \times R_a/100)]$

R_a = Relative humidity of the ambient air, in percent.

P_d = Saturated vapor pressure, in mm Hg (kPa) at the ambient dry bulb temperature.

P_B = Barometric pressure, in mm Hg (kPa).

V_{mix} = Total dilute exhaust volume in cubic feet per test phase corrected to standard conditions (528° R) (293° K) and 760 mm Hg (101.3 kPa)).

For PDP-CVS, V_{mix} is:

$$V_{mix} = \frac{V_o \times N(P_B - P_A)\ (528°\ R)}{(760\ mm\ Hg)\ (T_p)}$$

for SI units,

$$V_{mix} = \frac{V_o \times N(P_B - P_A)\ (293.15°\ K)}{(101.325\ kPa)\ (T_p)}$$

Where:

V_o = Volume of gas pumped by the positive displacement pump, in cubic feet (m³) per revolution. This volume is dependent on the pressure differential across the positive displacement pump.

N = Number of revolutions of the positive displacement pump during the test phase while samples are being collected.

P_B = Barometric pressure, in mm Hg (kPa).

P_A = Pressure depression below atmospheric measured at the inlet to the positive displacement pump, in mm Hg (kPa) (during an idle mode).

T_p = Average temperature of dilute exhaust entering positive displacement pump during test, °R(K).

(d) Example calculation of mass values of exhaust emissions using positive displacement pump:

(1) For the "Transient" phase of the cold start test assume the following: V_o 0.0077934 m³/revolution; N = 12,115; R = 20.5 percent; R_a = 20.5 percent; P_B = 99.05 kPa; P_d = 3.382 kPa; P_A = 9.851 kPa; T_p = 309.8 °K; THCe = 249.75 ppm, carbon equivalent; CH_{4e} = 13.0 ppm; NOx_e = 38.3 ppm; CO_{em} = 311.23 ppm; CO_{2e} = 0.415 percent; THC_d = 4.90 ppm; CH_{4d} = 1.8 ppm; NOx_d = 0.3 ppm; CO_{dm} 8.13 ppm; CO_{2d} = 370 ppm; D_{ct} = 5.650 km.

Then:

$V_{mix} = (0.007934)(12,115)[(99.05 - 9.851)(293.15)/(101.325)(309.81)] = 78.651$ m³ per test phase.

$H = (6:211)(20.5)(3.382)/[(99.05) - (3.382 \times 20.5/100)] = 4.378$ grams of water per kg of dry air.

$K_H = 1/]1-0.0329(4.378 - 10.71)] = 0.8276$

$CO_e = [1-0.01925(0.415) - 0.000323\ (20.5)]\ 311.23 = 306.68$ ppm

$CO_d = [1-0.000323(20.5)]8.13 = 8.08$ ppm

$DF = 13.4/[0.415 + (249.75 + 306.68) \times 1\ 0^{-4}] = 28.472$

$THC_{conc} = 249.75 - 4.9\ (1 - 1/28.472) = 245.02$ ppm

$THC_{mass} = (78.651)(576.7)(245.02/1,000,000) = 11.114$ grams per test phase

$CH_{4\ conc} = 13.0 - 1.8(1 - 1/28.472) = 11.26$ ppm

$CH_{4\ mass} = (78.651)(667.1)(11.26/1,000,000) = 0.591$ grams per test phase

$NMHC_{mass} = 11.114 - 0.591 = 10.523$ grams per test phase

$NO_{x\ conc} = 38.3 - 0.3\ (1 - 1/28.472) = 38.01$ ppm

$NO_{x\ mass} = (78.651)(1913)(38.01/1,000,000)\ (0.8276) = 4.733$ grams per test phase

$CO_{conc} = 306.68 - 8.08\ (1 - 1/28.472) = 298.88$ ppm

$CO_{mass} = (78.651)(1164)(298.88/1,000,000) = 27.382$ grams per test phase

$CO_{2\ conc} = 0.415 - 370\ (1 - 1/28.472)10^{-4} = 0.3703$ percent

$CO_{2\ mass} = (78.651)(1843)(0.3793/100) = 549.81$ grams per test phase

(2) For the stabilized portion of the cold start test assume that similar calculations resulted in the following:

$THC_{mass} = 7.184$ grams per test phase

$NMHC_{mass} = 6.9$ grams per test phase

$NO_{x\ mass} = 2.154$ grams per test phase

$CO_{mass} = 64.541$ grams per test phase

$CO_{2\ mass} = 529.52$ grams per test phase

$D_s = 6.070$ kilometers

(3) For the "transient" portion of the hot start test assume that similar calculations resulted in the following:

$THC_{mass} = 6.122$ grams per test phase

$NMHC_{mass} = 5.8$ grams per test phase

$NO_{x\ mass} = 7.056$ grams per test phase

$CO_{mass} = 34.964$ grams per test phase

$CO_{2\ mass} = 480.93$ grams per test phase

$D_{ht} = 5.660$ kilometers

(4) Weighted mass emission results:

$THC_{wm} 0.43\ [(11.114 + 7.184)/(5.650 + 6.070)] + 0.57\ [(6.122 + 7.184)/(5.650 + 6.070)] = 1.318$ grams total hydrocarbon per vehicle kilometer

$NMHC_{wm} = 0.43[10.523 + 6.90)/(5.650 + 6.070)] + 0.57[(5.80 + 6.90)/(5.650 + 6.070)] = 1.257$ grams per vehicle kilometer

$NO_{x\ wm} = 0.43[(4.733 + 2.154)/(5.650 + 6.070)] + 0.57[(7.056 + 2.154)/(5.650 + 6.070)] = 0.700$ grams per vehicle kilometer

$CO_{wm} = 0,43\ [(27.362 + 64.541)/(5.650 + 6.070); + 0.57[34.964 + 64.541)/(5.650 + 6.070)] = 8.207$ grams per vehicle kilometer

$CO_{2wm} = 0.43\ [(549.81 + 529.52)/(5.650 + 6.070)] + 0.57\ [(480.93 + 529.52)/(5.650 + 6.070); = 88.701$ grams per vehicle kilometer.

32. In § 86.1310–84, the introductory text of paragraphs (a) and (a)(2) are proposed to be revised as follows:

§ 86.1310–84 Exhaust gas sampling and analytical system; diesel engines.

(a) *General.* The exhaust gas sampling system described in this paragraph is designed to measure the true mass of gaseous emissions in the exhaust of heavy-duty diesel engines. This system utilizes the CVS concept (described in § 86.1309–84) of measuring mass emissions of CH_4 (optional), NO_x, CO, and CO_2. A continuously integrated system is required for THC measurement, and is allowed for NO_x, CO, and CO_2. The mass of gaseous emissions is determined from the sample concentration and total flow over the test period. General requirements are as follows:

* * * * *

(2) The THC analytical system for diesel engines requires a heated flame ionization detector (HFID) and heated sample system. The methane analytical system (optional) requires a gas chromatograph with a flame ionization detector (FID) for methane detection:

* * * * *

33. In § 86.1311–84, paragraph (a) and the introductory text of paragraph (b), are proposed to be revised as follows:

§ 86.1311–84 Exhaust gas analytical system. CVS bag sample.

(a) *Schematic drawings.* Figure N84–5 (N84–5(a)) is a schematic drawing of the exhaust gas analytical system used for analyzing CVS bag samples from either gaosline-fueled or diesel engines. Since various configurations can produce accurate results, exact conformance with the drawing is not required. Additional components such as instruments, valves, solenoids, pumps and switches may be used to provide additional information and coordinate the functions of the component systems.

(b) *Major component description.* The analytical system, Figure N84–5 (N84–5(a)) consists of a flame ionization detector (FID) for the determination of total hydrocarbons, gas chromatograph and flame ionization detector for determination of methane, nondispersive infrared analyzers (NDIR) for the determination of carbon monoxide and carbon dioxide and a chemiluminescence analyzer (CL) for the determination of oxides of nitrogen. The exhaust gas analytical system shall conform to the following requirements:

* * * * *

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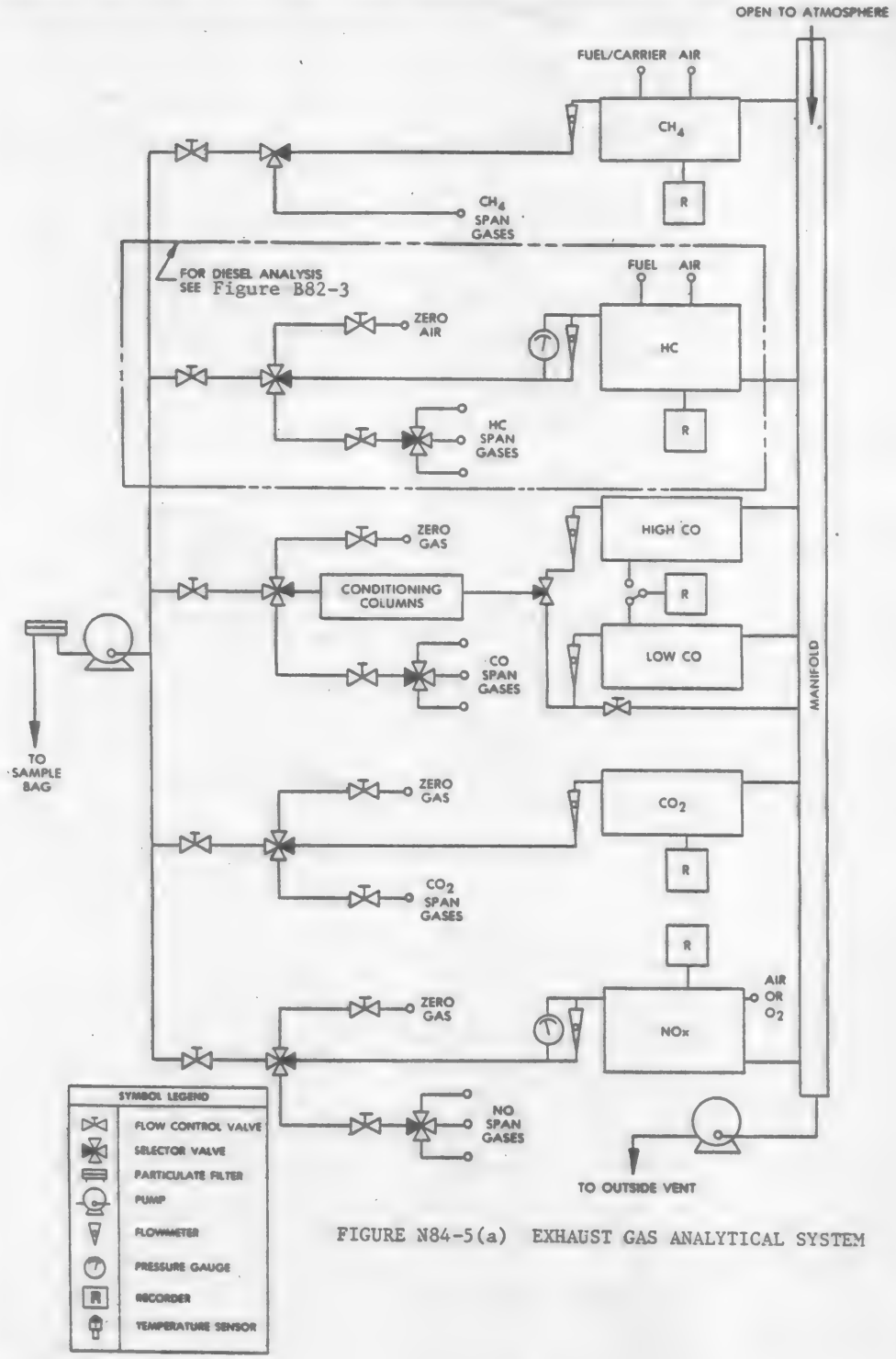

FIGURE N84-5(a) EXHAUST GAS ANALYTICAL SYSTEM

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34. In § 86.1314–84, paragraph (a)(2) is proposed to be revised as follows:

§ 86.1314–84 Analytical gases.

(a) * * *

(2) Gases for the total hydrocarbon analyzer shall be single blends of propane using air as the diluent. Gases for the methane analyzer shall be single blends of methane using air as the diluent.

* * * * *

35. In § 86.1316–84, paragraph (b)(1) is proposed to be revised as follows:

§ 86.1316–84 Calibrations; frequency and overview.

* * * * *

(b) * * *

(1) Calibrate the total hydrocarbon analyzer, methane analyzer, carbon dioxide analyzer, carbon monoxide analyzer and oxides of nitrogen analyzer.

* * * * *

36. Section 86.1321–84 is proposed to be revised to read as follows:

§ 86.1321–84 Hydrocarbon analyzer calibration.

(a) *Total hydrocarbon analyzer.* The FID total hydrocarbon analyzer shall receive the following initial and periodic calibration. The HFID shall be operated to a set point ±10° F (±5.5° C) between 365 and 385° F (185 and 197° C).

(1) Initial and periodic optimization of detector response. Prior to its introduction into service and at least annually thereafter the FID hydrocarbon analyzer shall be adjusted for optimum hydrocarbon response. Alternate methods yielding equivalent results may be used, if approved in advance by the Administrator.

(i) Follow the manufacturer's instructions for initial instrument start-up and basic operating adjustment using the appropriate fuel (see § 86.1314–84) and zero-grade air.

(ii) Optimize on the most common operating range. Introduce into the analyzer, a propane in air mixture with a propane concentration equal to approximately 90% of the most common operating range.

(iii) One of the following procedures is required for FID or HFID optimization.

(A) The procedures outlined in Society of Automotive Engineers (SAE) paper No. 770141, "Optimization of Flame Ionization Detector for Determination of Hydrocarbons in Diluted Automobile Exhaust"; author, Glenn D. Reschke.

(B) The HFID optimization procedures outlined in 40 CFR Part 86, Subpart D.

(C) Alternate procedures are allowed, if approved in advance by the Administrator.

(D) After the optimum flow rates have been determined, they are recorded for future reference.

(2) Initial and periodic calibration. Prior to its introduction into service and monthly thereafter the FID or HFID hydrocarbon analyzer shall be calibrated on all normally used instrument ranges. Use the same flow rate as when analyzing samples.

(i) Adjust analyzer to optimize performance.

(ii) Zero the hydrocarbon analyzer with zero-grade air.

(iii) Calibrate on each used operating range with propane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75 and 90 percent of that range. For each range calibrated, if the deviation from a least-squares best-fit straight line is 2% or less of the value at each data point, concentration values may be calculated by use of a single calibration factor for that range. If the deviation exceeds 2% at any point, the best-fit non-linear equation which represent the data to within 2% of each test point shall be used to determine concentration.

(b) *Methane analyzer.* The methane analyzer shall receive the following initial and periodic calibration:

(1) *Initial and period optimization of detector response.* Prior to its introduction into service and at least annually thereafter the FID detector shall be adjusted for optimum methane response. Alternate methods yielding equivalent results may be used if approved in advance by the Administrator.

(i) Follow the manufacturer's instructions for instrument start-up and basic operating adjustment, using the appropriate fuel, carrier, and zero grade air.

(ii) Optimize on the most commonly used range. Introduce into the analyzer a methane in air mixture with a methane concentration equal to approximately 90 percent of the most common range.

(iii) Select an operating FID fuel flow rate that will give near maximum response and least variation in response with minor variations in fuel flow rate.

(iv) To determine the optimum FID air flow rate, use the FID fuel flow setting determined above and vary air flow rate for maximum response.

(v) After the optimum flow conditions have been determined, actual flow rates are measured and recorded for future reference.

(2) *Initial and periodic calibration.* Prior to its introduction into service and at least monthly thereafter the methane analyzer shall be calibrated on all normally used ranges. Use the same flow rates when analyzing samples.

(i) Adjust analyzer to optimum flow conditions as determined above.

(ii) Obtain a stable baseline reading using carrier gas.

(iii) Calibrate on each normally used operating range with methane in air calibration gases having nominal concentrations of 15, 30, 60 and 90 percent of that range. Additional calibration points may be generated. For each range calibrated, if the deviation from a least-squares best-fit straight line is two percent or less, or within 0.1 ppm methane of the value of each data point (excluding zero), a linear equation may be used to determine the methane concentration. If the deviation exceeds two percent or 0.1 ppm methane at any data point (whichever is highest), the best fit non-linear equation which represents the data to within two percent (or 0.1 ppm methane) of each point shall be used to determine the concentration. Use methane in air calibration gases having nominal concentrations of 15, 30, 45, 60, 75, and 90 percent of each range for the calibration of non-linear instruments.

(iv) A stable baseline must be obtained before and after the methane peak elution. A stable baseline is defined as the time equal to or greater than 25 percent of the methane peak width at half peak height. The methane peak must be resolved from other gases, such as oxygen, nitrogen, and carbon monoxide. Methane concentration shall be determined by peak height measurement or area integration.

37. In § 86.1340–84, paragraph (d)(9) is proposed to be revised as follows:

§ 86.1340–84 Exhaust sample analysis.

* * * * *

(d) * * *

(9) Measure THC (except diesels), CH_4, CO, CO_2, and NOx concentrations in the sample bag(s) with approximately the same flow rates and pressures used in paragraphs (d)(5) of this section. Constituents measured continuously do not require bag analysis.

* * * * *

38. In § 86.1342–84, paragraph (a) is proposed to be amended by revising the definition of the term "A_{zz}" immediately following the word "where:" and paragraphs (b)(1), (c)(1), (d)(1), (e), (f), (g), (h) and (i) are proposed to be revised as follows:

§ 86.1342–84 Calculations; exhaust emissions.

(a) * * *

Where:

A_{wm} = Weighted mass emissions level (THC, NMHC, CO, CO_2, or NO_x) in grams per brake horsepower hour.

* * * * *

(b) The mass of each pollutant for the cold start test and the hot start test for bag measurements and diesel heat exchanger sample system measurements is determined from the following equations:

(1) Total hydrocarbon mass:

$$THC_{mass} = V_{mix} \times Density_{THC} \times (THC_{conc.} / 1{,}000{,}000)$$

Non-methane hydrocarbon mass:

$$NMHC_{mass} = (THC_{mass}) - (CH_{4\ mass} = THC_{mass} - (V_{mix} \times Density_{CH\ 4} \times (CH_{4\ conc} / 1{,}000{,}000))$$

* * * * *

(c) The mass of each pollutant for the cold start test and the hot start test for flow compensated sample systems is determined from the following equations:

(1)

$$THC_{mass} = p \sum_{i=1} [(THC_e)_i \times (V_{mix})_i \times (Density_{THC}) \times gt] / 10^6$$

$$\frac{THC_d}{10_6} \frac{(1-1)}{DF} \times V_{mix} \times Density_{THC}$$

$NMHC_{mass} = (THC_{mass}) - (CH_{4mass}$ (bag measurement)

* * * * *

(d) Meaning of the Symbols:

(1) THC_{mass} = Total Hydrocarbon emissions, in grams per test phase.

Density = Density of total hydrocarbons is 16.33 gm/ft_3 (0.5767 kg/m^3 assuming a carbon to hydrogen ratio of 1:1.85 at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

THC_{conc} = Total hydrocarbon concentration of the dilute exhaust sample corrected for background, in ppm carbon equivalent, i.e. equivalent propane ×3.

$THC_{conc} = THC_e - THC_d(1-1/DF)$.

$CH_{4\ mass}$ = Methane emissions, in grams per test phase.

Density = Density of Methane is 18.89 g/ft^3 (0.6671 kg/m^3 at 68°F (20°C) and 760 mm Hg (101.3 kPa) pressure.

$CH_{4\ conc}$ = Methane concentration of the dilute exhaust sample corrected for methane background, in ppm carbon.

$CH_{4\ conc} = CH_{4e} - CH_{4d}\ (1-1/DF)$.

Where:

THC_e = Total hydrocarbon concentration of the dilute exhaust bag sample, or for diesel heat exchanger systems, average hydrocarbon concentration of the dilute exhaust sample as calculated from the integrated THC traces in ppm carbon equivalent. For flow compensated sample systems THC_e is the instantaneous concentration.

THC_d = Total hydrocarbon concentration in the dilution air as measured, in ppm carbon equivalent.

CH_{4e} = Methane concentration of the dilute exhaust sample in ppm carbon equivalent.

CH_{4d} = Methane concentration of the dilution air as measured in ppm carbon equivalent.

* * * * *

(e) Sample calculation of mass values of exhaust emissions:

(1) Assume the following test results for gasoline engine:

	Test results	
	Cold start cycle	Hot start cycle
Vmix	6,924 ft ³	6,873 ft ³.
R	30.2 pct	30.2 pct.
R_a	30.2 pct	30.2 pct.
P_B	735 mm Hg	735 mm Hg.
P_d	22.676 mm Hg	22.676 mm Hg.
THC_e	132.07 ppm C equivalent.	86.13 ppm C equivalent.
CH_{4e}	8.00 ppm C equivalent.	5.00 ppm C equivalent.
NO_{xe}	7.86 ppm	10.96 ppm.
CO_{em}	171.22 ppm	114.28 ppm.
CO_{2e}	0.178 pct	0.361 pct.
THC_d	3.60 ppm C equivalent.	8.70 ppm C equivalent.
CH_{4d}	1.80 ppm C	1.90 ppm C.
NO_{xd}	0.0 ppm	0.0 ppm.
CO_{dm}	0.89 ppm	0.89 pct.
CO_{2d}	0.0 pct	0.038 pct.
BHP–HR	0.250	0.347.

Then:

Cold start test:

$H = [(43.478)(30.2)(22.676)]/[735 - (22.676)(30.2)/100]$
$= 41$ grains of water per pound of dry air.

$K_H = 1/[1-0.0047(41-75)] = 0.862$

$CO_e = [1-0.01925(0.178)-0.000323(30.2)]171.22 = 169.0$ ppm

$CO_d = [1-0.000323(30.2)]0.89 = 0.881$ ppm

$DF = 13.4/[0.178 + (132.1 + 168.9)(10^{-4})] = 64.392$

$THC_{conc} = 132.1 - 3.6[1-(1/64.392)] = 128.6$ ppm

$THC_{mass} = 6924\ (16.33)(128.6/1{,}000{,}000) = 14.53$ grams

$CH_{4\ conc} = 8.00 - 1.80\ [1-(1/64.392)] = 6.23$ ppm

$CH_{4mass} = 6924\ (18.89)(6.23/1{,}000{,}000) = 0.81$ grams

$NMHC_{mass} = 14.53 - 0.81 = 13.72$ grams

$NO_{xconc} = 7.86 - 0.0\ [1-(1/64.392)] = 7.86$ ppm

$NO_{xmass} = 6924\ (54.16)(0.862)(7.86)/1{,}000{,}000 = 2.54$ grams

$CO_{conc} = 169.0 - 0.881\ [1-(1/164.392)] = 168.13$ ppm

$CO_{mass} = 6924\ (32.97)(168.13/1{,}000{,}000) = 38.38$ grams

$CO_{2\ conc} = 0.178 - 0.0\ (1-1/64.392) = 0.178\%$

$CO_{2\ mass} = 6924\ (51.85-85)(0.178/100) = 639$ grams

Hot start test:

Assume similar calculations result in the following:

$THC_{mass} = 8.72$ grams

$NMHC_{mass} = 8.28$ grams

$NO_{x\ mass} = 3.49$ grams

$CO_{mass} = 25.70$ grams

$CO_{2\ mass} = 1226$ grams

(2) Weighted mass emission results:

$$THC_{wm} = \frac{1/7\ (14.53) + 6/7\ (8.72)}{1/7\ (0.279) + 6/7\ (0.347)} =$$

28.6 grams/BHP–HR

$$NMHC_{wm} = \frac{1/7\ (13.72) + 6/7\ (8.28)}{1/7\ (0.259) + 6/7\ (0.347)} =$$

27.1 grams/BHP–HR

$$NO_{x\ wm} = \frac{1/7\ (2.54) + 6/7\ (3.49)}{1/7\ (0.259) + 6/7\ (0.347)} =$$

10.0 grams/BHP–HR

$$CO_{wm} = \frac{1/7\ (38.35) + 6/7\ (25.70)}{1/7\ (0.259) + 6/7\ (0.347)} =$$

82.2 grams/BHP–HR

$$CO_{wm} = \frac{1/7\ (639) + 6/7\ (1226)}{1/7\ (0.259) + 6/7\ (0.347)} =$$

3415 grams/BHP–HR

(f) The final report brake-specific fuel consumption (BSFC) shall be computed by use of the following formula:

$$BSFC = \frac{1/7\ (M_c) + 6/7\ (M_h)}{1/7\ (BHP\text{–}HR_c) + 6/7\ (BHP\text{–}HR_H)}$$

Where:

BSFC = Brake specific fuel consumption in pounds of fuel per brake horsepower-hour (lbs/BHP–HR).

M_c = Mass of fuel, in pounds, used by the engine during the cold start test.

M_H = Mass of fuel, in pounds, used by the engine during the hot start test.

$BHP\text{–}HR_c$ = Total brake horsepower-hours (brake horsepower integrated with respect to time) for the cold start test.

$BHP\text{–}HR_H$ = total brake horsepower-hours (brake horsepower integrated with respect to time) for the hot start test.

(g) The mass of fuel for the cold start and hot start test is determined from the following equation:

$M = (G_s/R_s)\ (1/453.6)$

(h) Meaning of symbols:

M = Mass of fuel, in pounds, used by the engine during the cold or hot start test.

G_s = Grams of carbon measured during the cold or hot start test.

$G_s = [12.011/(12.011 + a(1.008))]THC_{mass} + 0.429\ CO_{mass} + 0.273\ CO_{2\ mass}$.

Where:

THC_{mass} = Total hydrocarbon emissions, in grams for cold or hot start test.

CO_{mass} = Carbon monoxide emissions, in grams for cold or hot start test.

$CO_{2\ mass}$ = Carbon dioxide emissions, in grams for cold or hot start test.

a = The measured hydrogen to carbon ratio of the fuel.

R_s = The grams of carbon in the fuel per gram of fuel.

$R_s = 12.011/[12.001 + a\ (1.008)]$.

(i) Sample calculation of brake-specific fuel consumption:

(1) Assume the following test results:

	Test results	
	Cold start cycle	Hot start cycle
BHP–HR	6.945	7.078.
a	1.85	1.85.
THC_{mass}	37.06 grams	28.62 grams.
CO_{mass}	357.69 grams	350.33 grams.

	Test results	
	Cold start cycle	Hot start cycle
CO_2 mass	5419.62 grams	5361.32 grams.

Then:

G_s for cold start test = [12.011/(12.011 + (1.85)(1.008))](37.08) + 0.429(357.69) + 0.273(5419.62) = 1665.10 grams

G_s for hot start test = [12.011/(12.011 + (1.85)(1.008)))(28.32) + 0.429(350.33) + 0.273(5261.32) = 1638.88 grams

$R_s = 12.011/[12.011 + 1.85(1.008)] = 0.866$

$M_c = (1665.10/0.866(1/453.6) = 4.24$ lbs.

$M_H = (1638.88/0.866(1/453.6) = 4.17$ lbs.

(2) Brake-specific fuel consumption results:

BSFC =

1/7 (4.24) + 6/7 (4.17)

1/7 (6.945) + 6/7 (7.078)

= 0.592 lbs. of fuel/BHP–HR

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AGENCY PUBLICATION ON ASSIGNED DAYS OF THE WEEK

The following agencies have agreed to publish all documents on two assigned days of the week (Monday/Thursday or Tuesday/Friday). This is a voluntary program. (See OFR NOTICE 41 FR 32914, August 6, 1976.)

Monday	Tuesday	Wednesday	Thursday	Friday
DOT/SECRETARY	USDA/ASCS		DOT/SECRETARY	USDA/ASCS
DOT/COAST GUARD	USDA/FNS		DOT/COAST GUARD	USDA/FNS
DOT/FAA	USDA/REA		DOT/FAA	USDA/REA
DOT/FHWA	USDA/SCS		DOT/FHWA	USDA/SCS
DOT/FRA	MSPB/OPM		DOT/FRA	MSPB/OPM
DOT/MA	LABOR		DOT/MA	LABOR
DOT/NHTSA	HHS/FDA		DOT/NHTSA	HHS/FDA
DOT/RSPA			DOT/RSPA	
DOT/SLSDC			DOT/SLSDC	
DOT/UMTA			DOT/UMTA	

Documents normally scheduled for publication on a day that will be a Federal holiday will be published the next work day following the holiday. Comments on this program are still invited.

Comments should be submitted to the Day-of-the-Week Program Coordinator, Office of the Federal Register, National Archives and Records Service, General Services Administration, Washington, D.C. 20408.

REMINDERS

The "reminders" below identify documents that appeared in issues of the **Federal Register** 15 days or more ago. Inclusion or exclusion from this list has no legal significance.

Deadlines for Comments on Proposed Rules for the Week of December 27, 1981 through January 2, 1982

AGRICULTURE DEPARTMENT

Agricultural Marketing Service—

54919 11–5–81 / Increase in fees for Federal livestock grading and certification services; comments by 12–31–81

50509 10–14–81 / Increase in fees for Federal meat grading and certification services; comments by 12–31–81

Food and Nutrition Service—

35629 7–10–81 / National School Lunch Program and State Administrative Expense Fund; Assessment, Improvement and Monitoring System (AIMS); comments by 12–31–81

60592 12–11–81 / Summer Food Service Program; limitation of sponsor and geographic area eligibility; comments by 12–31–81

Soil Conservation Service—

52119 10–28–81 / Support activities; compliance with NEPA; comments by 12–28–81

CIVIL AERONAUTICS BOARD

52585 10–27–81 / Aircraft accident liability insurance; Canadian Charter Air Taxi Operators; classification and exemption of air taxi operators; comments by 12–28–81

53195 10–28–81 / Removal of "comments air carrier" classification form cargo and mail carriers; comments by 12–28–81

COMMERCE DEPARTMENT

National Oceanic and Atmospheric Administration—

55732 11–12–81 / Foreign Fishing; reports and record keeping; comments by 12–28–81

EDUCATION DEPARTMENT

53716 10–30–81 / Post employment conflicts of interest; comments by 12–29–81

ENERGY DEPARTMENT

Economic Regulatory Administration—

58052 11–27–81 / Powerplant and industrial fuel use; comments by 12–28–81

ENVIRONMENTAL PROTECTION AGENCY

56464 11–17–81 / Connecticut application for interim authorization, Phase 1, Hazardous Waste Management Program; comments by 12–30–81

53704 10–30–81 / Fluoroalkenes; response to Interagency Testing Committee; comments by 12–29–81

FEDERAL COMMUNICATIONS COMMISSION

60022 12–8–81 / Amendment to allow the selection from among mutually exclusive competing applications using random selection or lotteries instead of comparative hearings; reply comments by 12–30–81

[*See also* 46 FR 58110, 11–30–81]

56473 11–17–81 / Calculation of necessary bandwidth for frequency modulation microwave radio relay systems; comments by 12–29–81

60222 12–9–81 / Experimental, auxiliary, and special broadcast and other program distributional services; current policy and procedures; comments by 1–2–82

50990 10–16–81 / FM broadcast station in Pittsburg, Kansas; changes in table of assignments; reply comments by 12–28–81

50989 10–16–81 / FM broadcast station in Williams, Ariz.; changes in table of assignments; reply comments by 12–28–81

55279 11–9–81 / Formulation of policies relating to broadcast renewal applicant; comments by 12–28–81

60031 12–18–81 / Specialized mobile radio system; revision of contour measurement; comments by 12–30–81

50988 10–16–81 / TV broadcast station in Cape Coral, Fla., changes in table of assignments; reply comments by 12–28–81

56831 11–19–81 / TV broadcast station; changes in table of assignments; Greenwood, S.C.; comments by 12–31–81

FEDERAL RESERVE SYSTEM

54565 11–3–81 / Bank holding companies (Regulation Y); Nonbanking activities; application by Bank America Corp. to provide management consulting services to nonbank depository institutions; comments by 12–30–81

HEALTH AND HUMAN SERVICES DEPARTMENT

Food and Drug Administration—

58297 12–1–81 / Food additives permitted for direct addition to food for human consumption; zinc methionine sulfate tablets; objections by 12–31–81

Health Care Financing Administration—

48524 10–1–81 / Medicaid program; freedom of choice: waivers of and exceptions to State plan requirements; comments by 12–30–81

48532 10–1–81 / Medicaid program; home and community-based services; comments by 12–30–81

48556 10–1–81 / Medicaid program; miscellaneous medicaid provisions—increased State flexibility; comments by 12–30–81

48550 10–1–81 / Medicare and Medicaid program; less than effective drugs and inpatient hospital tests; comments by 12–30–81

Public Health Service—

52566 10–27–81 / Qualifications of Health Maintenance Organizations; comments by 12–28–81

Social Security Administration—

53720 10–30–81 / Proration of shelter, utilities, and similar need items for AFDC children living with ineligible relatives; comments by 12–29–81

53449 10–29–81 / Supplemental security income benefits; eligibility, amount of benefits, reports required, income, resources, and State supplementation provisions, agreements, and payments; comments by 12–28–81

HOUSING AND URBAN DEVELOPMENT DEPARTMENT

Federal Housing Commissioner—Office of Assistant Secretary for Housing—

57838 11–25–81 / Schedule A—Fair market rents for new construction and substantial rehabilitation; all market areas; comments by 12–28–81

INTERIOR DEPARTMENT

Land Management Bureau—

58264 11–30–81 / Outer Continental Shelf minerals and rights-of-way management, general; amendment to streamline and clarify existing provisions; comments by 12–28–81

Reclamation Bureau—

37528 7–21–81 / Acreage limitation; reclamation rules and regulations; comments by 12–31–81

37529 7–21–81 / Acreage limitation; resumption of comment period on draft environmental impact statement; comments by 12–31–81

Surface Mining Reclamation and Enforcement Office—

57697 11–25–81 / Modified portions of the permanent regulatory program; Maryland; comments by 12–28–81

JUSTICE DEPARTMENT

Drug Enforcement Administration—

53405 10–29–81 / Exempt chemical preparations; comments by 12–28–81

PANAMA CANAL COMMISSION

60216 12–9–81 / Access to information concerning individuals; proposed exemption from access of system of records under the Privacy Act; comments by 12–29–81

POSTAL SERVICE

58097 11–30–81 / National Environmental Policy Act (NEPA); amendment of categorical exclusions; comments by 12–30–81

SECURITIES AND EXCHANGE COMMISSION

53679 10–30–81 / Regulatory flexibility agenda; comments by 12–31–81

TRANSPORTATION DEPARTMENT

Coast Guard—

45631 9–14–81 / Maneuvering performance standards for U.S. flag vessels; comments by 1–12–82

Federal Aviation Administration—

8316 1–26–81 / Development and submission of airport operator's noise compatibility planning programs and the FAA's administrative process for evaluating and determining the effects of those programs; comments by 12–31–81

TREASURY DEPARTMENT

Internal Revenue Service—

52391 10–27–81 / Income tax withholding; increase; comments by 12–28–81

VETERANS ADMINISTRATION

58095 11–30–81 / Privacy Act of 1974; access to records; comments by 12–28–81

Deadlines for Comments on Proposed Rules for the Week of January 3 through January 9, 1982

AGRICULTURE DEPARTMENT

Farmers Home Administration—

54949 11–5–81 / Appeal procedure; comments by 1–4–82

54751 11–4–81 / Insured farmer program borrower responsibilities; comments by 1–4–82

COMMERCE DEPARTMENT

Patent and Trademark Office—

49602 10–7–81 / Trademark application; filing dates; comments by 1–5–82

CONSUMER PRODUCT SAFETY COMMISSION

58702 12–3–81 / Withdrawal of proposed rule and reproposal of rule to regulate under the CPSA risk of injury that may be presented by certain stuffed toys; comments by 1–4–81

ENERGY DEPARTMENT

Federal Energy Regulatory Commission—

60214 12–9–81 / Form No. 423: Monthly report of cost and quality of fuels for electric plants; comments by 1–4–82

ENVIRONMENTAL PROTECTION AGENCY

60217 12–9–81 / Approval and promulgation of implementation plan; Indiana; comments by 1–6–82

55123 11–6–81 / Approval and promulgation of implementation plans; Iowa; comments by 1–5–82

55220 11–6–81 / Grants for construction of treatment works; comments by 1–8–82

55551 11–10–81 / Interstate pollution abatement; announcement of receipt of petition from Maine; comments by 1–4–82

45383 9–11–81 / Interstate pollution abatement; announcement of supplemented petition for New York and Pennsylvania; comments by 1–4–82

60217 12–9–81 / Phenmedipham; tolerance; comments by 1–8–82

FEDERAL COMMUNICATIONS COMMISSION

56836 11–9–81 / Elimination of requirement for type approval of aural modulation monitors; extension of time; reply comments by 1–5–82

[*See also* 46 FR 52398; 10–27–81]

52151 10–26–81 / FM broadcast station; Atlantic City, N.J.; changes in table of assignments; reply comments by 1–4–82

52145 10–26–81 / FM broadcast station; Celina, Clinton, Knoxville, LaFollette, and Sweetwater, Tennessee; Louisville, Oneida, Radcliff, Somerset, and Stanford, Kentucky; Madison and New Albany, Indiana; changes in table of assignments; comments by 1–4–82

56833 11–19–81 / FM broadcast station; changes in table of assignments; Freeport, Tex.; comments by 1–4–82

60221 12–9–81 / Frequency allocations and radio treaty matters general rules and regulation; reply comments by 1–6–82

57078 11–20–81 / Subscription television service; reply comments by 1–5–82

FEDERAL MARITIME COMMISSION

54390 11–2–81 / Tariffs filed by common carriers in foreign commerce of U.S.; time/ volume rate contracts; filing regulations; comments by 1–4–82

FEDERAL RESERVE SYSTEM

55533 11–10–81 / Credit by brokers and dealers; proposal to permit use of letters of credit as the required deposit when securities are borrowed; comments by 1–5–82

FEDERAL TRADE COMMISSION

54756 11–4–81 / Gifford-Hill-American, Inc.; proposed consent agreement with analyses to aid public comment; comments by 1–4–82

54758 11–4–81 / Renuzit Home Products Co.; proposed consent agreement with analysis to aid public comment; comments by 1–4–82

HEALTH AND HUMAN SERVICES DEPARTMENT

Child Support Enforcement Office—

54554 11–2–81/Requests to use Federal Parent Locator Service in parental kidnapping and child custody cases; comments by 1–4–82

INTERSTATE COMMERCE COMMISSION

56629 11–18–81/Rules governing publication of exceptions ratings higher than classification ratings; comments by 1–4–82

MANAGEMENT AND BUDGET OFFICE

56223 11–16–81/Application of labor laws to government acquisitions, dismantling, demolition or removal of improvements, and contract termination clauses; comments by 1–6–82

NUCLEAR REGULATORY COMMISSION

55271 11–9–81/Transfer of respiratory protection provisions from regulatory guide (now incorporated by reference) into Code of Federal Regulations; comments by 1–4–82

PERSONNEL MANAGEMENT OFFICE

55119 11–6–81/Pay administration (general); recovery of overpayments; comments by 1–5–82

SMALL BUSINESS ADMINISTRATION

58701 12–3–81/Business loans; export revolving line of credit loans; comments by 1–4–82

TRANSPORTATION DEPARTMENT

Coast Guard—

49914 10–8–81/Life floats and buoyant apparatus; requirements for painters with float-free links and other changes; comments by 1–6–82

Federal Aviation Administration—

54958 11–5–81/Advisory circular for airplane system design analysis; comments by 1–5–82

54957 11–5–81/Summary of petitions received and dispositions of petitions denied or withdrawn; comments by 1–5–82

TREASURY DEPARTMENT

Alcohol, Tobacco, and Firearms Bureau—

49597 10–7–81/Finger Lakes Viticultural Area; comments by 1–5–82

[Corrected at 46 FR 50568, 10–14–81]

Customs Service—

55273 11–9–81/Establishment of procedures for importation of certain antique articles; comments by 1–8–82

Fiscal Service—

54763 11–4–81/Extension of the Treasury's reclamation authority; comments by 1–6–82

Next Week's Meetings

DEFENSE DEPARTMENT

Office of the Secretary—

58144 11–30–81/Defense Science Board Task Force on Defense Nuclear Agency Technology Base Program, Kirtland Air Force Base, N. Mex. (closed). 12–29 and 12–30–81

51798 10–22–81/Wage Committee. Washington, D.C. (closed), 12–29–81

List of Public Laws

Note: No public bills which have become law were received by the Office of the Federal Register for inclusion in today's List of Public Laws.

Last Listing December 22, 1981

Documents Relating to Federal Grant Programs

This is a list of documents relating to Federal grant programs which were published in the Federal Register during the previous week.

Applications Deadlines

61695 12–18–81/ED—Minority Institutions Science Improvement Program: Institutional, Design, and Cooperative project, 1–29–82 and special project, 3–5–82

61822 12–18–81/USDA/SEA—Plant Biology and Human Nutrition; Competitive Research Grants Program for Basic Research for Fiscal Year 1982; apply by 1–29, 2–1, 2–5 and 2–16–82 for various proposals

MEETINGS

61695 12–18–81/ED—Financing Elementary and Secondary Education Advisory Panel, Boston, Mass. (open), 1–19–82

61762 12–8–81/President's Commission on White House Fellowships—Washington, D.C. (open), 1–15–82

OTHER ITEMS OF INTEREST

61334 12–16–81/HHS/CSEO—Child Support Enforcement Research—demonstration grants; availability of FY '81 funds; cancellation of anticipated FY '82 projects

61735 12–18–81/HHS/PHS—Block grant to States; delegation of authority

61509 12–17–81/HHS/PHS—Preventive Health and Health Services Block Grant program; delegation of authority

61735 12–18–81/HHS/PHS—Primary Care Block Grants; delegation of authority

61455 12–17–81/HUD/FHC—Financial assistance to nonimmigrant student-aliens; correction to interim rule

[*See also* 46 FR 56421, 11–17–81]

61354 12–16–81/Justice/National Institute of Correction—Grant and contract review process

The Federal Register

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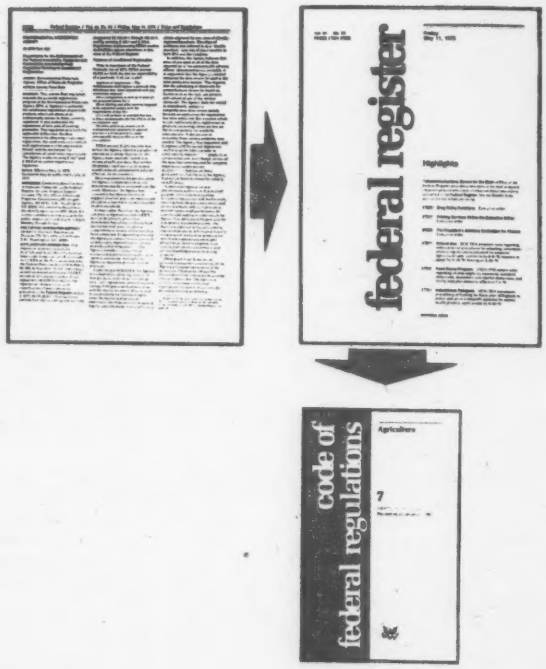

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